

**Appeal No. 2014-1362**

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**IN THE  
UNITED STATES COURT OF APPEALS  
FOR THE FEDERAL CIRCUIT**

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CAROLINA WATERWORKS, INC.

*Appellant,*

v.

TAYLOR MADE GROUP, LLC,

*Appellee.*

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**Appeal from the United States District Court for the  
District of South Carolina in Case No. 2:12-cv-02568-DCN.**

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**OPENING BRIEF OF APPELLANT**

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May 19, 2014

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**CERTIFICATE OF INTEREST**

Counsel for Appellant Carolina Waterworks, Inc. certifies the following:

1. The full name of every party or amicus represented by me is:  
  
Carolina Waterworks, Inc.
2. The name of the real party in interest represented by me is:  
  
Carolina Waterworks, Inc.
3. All parent corporations and any publicly held companies that own 10 percent or more of the stock of the party represented by me are:  
  
None.
4. The names of all law firms and the partners or associates that appeared for the party or amicus now represented by me in the trial court or agency or are expected to appear in this court are:

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### **STATEMENT OF RELATED CASES**

No other appeal in or from this same case was previously before this or any other appellate court. There are no other related cases pending in any district court.

### **STATEMENT OF JURISDICTION**

The trial court had jurisdiction under 28 U.S.C. § 1338(a) because Appellant's complaint, alleging infringement of U.S. Patent No. 6,955,574 ("the '574 patent"), arose under the Patent Laws of the United States. The trial court entered a final judgment of non-infringement under Fed. R. Civ. P. 54(b). Appellant filed a timely notice of appeal pursuant to Fed. R. App. P. 4(a)(1)(A).

This Court has jurisdiction under 28 U.S.C. § 1295(a)(1) because this is an appeal of a final judgment of a United States district court, wherein jurisdiction was based in whole or in part on 28 U.S.C. § 1338.



## **I. STATEMENT OF THE ISSUES**

1. Did the district court err in granting summary judgment of non-infringement of claims 1-24 and 35 of the '574 patent on the ground that the shackle in the accused buoy is allegedly not “connected” to a support plate, where: (1) the parties agree that “connected” means “mated, coupled or linked together such that a force can be transferred from one component to another;” (2) there is no dispute that two items can be “mated, coupled or linked together” (like two links in a chain) without being rigidly fastened; (3) during normal use, the shackle of the accused buoy is pressed tightly against the support plate with at least fifty pounds of force due to the weight of the anchor chain and the buoyancy of the buoy; (4) Appellant’s expert, a registered Professional Engineer, opined that the support plate in the accused buoy “serves to distribute the load between the shackle and the buoy shell,” thus satisfying the agreed-upon definition of “connected;” and (5) summary judgment is inappropriate where there are disputed issues of material fact?

2. Did the district court err in granting summary judgment of no indirect infringement based on its erroneous finding of no direct infringement?

## **II. STATEMENT OF FACTS**

### **A. Introduction**

This case involves a disputed issue of material fact, namely whether two components in the accused device are “connected” to each other. The parties agree

that “connected” means “mated, coupled or linked together such that a force can be transferred from one component to another.” A9. They disagree, however, as to whether the shackle in the accused buoy is “connected” to the buoy’s rolled PVC lip under this definition. Appellee Taylor Made Group, LLC (“Taylor”) moved for summary judgment of non-infringement, alleging, *inter alia*, that these components are not connected because “[t]here is no shackle nor anchor line attached to [the rolled PVC lip]” and the rolled PVC lip “diffuses no forces.” A2146. Appellant Carolina Waterworks, Inc. (“CWI”) opposed Taylor’s motion and submitted the declaration and expert report of Robert L. Horner, a registered Professional Engineer with twenty-five years of experience and specific knowledge of the “loads and forces that can be part of various aspects of buoys and moorings.” A2461. Mr. Horner opined that the rolled PVC lip in the accused buoy does, in fact, “distribute the load between the shackle and the buoy shell” (A2465), directly contrary to Taylor’s unsupported allegation that the rolled lip “diffuses no forces” (A2146).

Because the parties disputed this material fact during the summary judgment proceedings, and because CWI, as the non-movant, was entitled to all reasonable inferences in its favor, the district court erred in granting summary judgment of non-infringement. In so doing, the court improperly resolved a disputed issue of

fact and deprived CWI of its Seventh Amendment right to a jury trial on the question of infringement.

## **B. Background**

The '574 patent is directed to a buoy having a pocket in which a fastening device, like a shackle, is retained to prevent it from contacting and damaging a vessel tethered to the buoy. A31. The buoy also has a support plate that helps diffuse forces applied to the fastening device during normal operation of the buoy. A37-38. The '574 patent was issued on October 18, 2005 to inventor L. Keith Rogerson and is assigned to Appellant CWI. A31.

The idea for the inventions claimed in the '574 patent arose when one of CWI's salesmen noticed that many of the mooring buoys being used in the northeast had carpet wrapped around their shackles. A2287. The carpet was being used to prevent the boats' hulls from being scratched when they came into contact with the buoy hardware. *Id.* Mr. Rogerson, CWI's CEO, realized that carpet wrapped around a metal shackle in a saltwater environment would lead to corrosion, since the carpet would become wet and trap moisture around the shackle. *Id.* Recognizing a demand for a simpler, longer lasting, boat-friendly buoy, Mr. Rogerson invented the "Shackle Pocket Buoy" and filed the application that led to the '574 patent. A2288.

Because of its innovative, boat-friendly design, CWI's Shackle Pocket Buoy quickly grew in popularity, especially in the northeast. *Id.* This caught the attention of Taylor, a much larger company that competes with CWI in the market for mooring buoys and related components.

On March 17, 2005, Kevin Nagot, a sales representative of Kellogg Marine Supply in Hartford, Connecticut, contacted Kurt Forsman, a sales representative of Taylor's parent company, Derema Group. A2291. Mr. Nagot reported that CWI's Shackle Pocket Buoy was "becoming popular and should be explored by Taylor." *Id.* In response, Mr. Forsman emailed Jim DeRuscio, Taylor's Rotational Molding Product Leader, and David Karpinski, Taylor's Vice President of Sales, and stated: "These guys [i.e., CWI] are making their way into our market. *Can we crush them please!*" *Id.* (emphasis added).

On June 14, 2005, Mr. DeRuscio emailed Taylor's counsel, Bob Rowan at Nixon & Vanderhye, P.C., and stated: "Taylor Made products would like to offer a buoy *identical* to a product made by Carolina Waterworks, Inc. . . . The product is called a buoy with shackle pocket." A2297 (emphasis added). DeRuscio requested a patent clearance search "before we invest in tooling." *Id.* Mr. Rowan responded on June 30, 2005, that the general concept of a shackle pocket was the subject of several expired patents. A2298. Other portions of Mr. Rowan's email, however, have been redacted by Taylor's counsel in this litigation. *Id.*

Mr. Rogerson's patent application disclosing the Shackle Pocket Buoy was published on August 4, 2005, and the '574 patent issued two months later on October 18, 2005. A31.

Sometime thereafter, Taylor introduced its "T3C Buoy with Shackle Nest," the accused product in this case. A2288. "T3C" stands for "Tube Thru The Center," which is a feature of Taylor's entire line of T3C buoys, including the Shackle Nest buoy. A2302-04. Taylor also markets a "T3C Mooring Collar," which is designed to fit snugly into any of its T3C line of buoys, including the Shackle Nest buoy. A2147, A2244. Taylor currently advertises and sells the T3C Buoy with Shackle Nest as the "Sur-Moor Shackle Buoy." A2301.

### **C. The Patented Technology**

CWI appeals the district court's judgment with respect to claims 1-24 and 35 of the '574 patent.<sup>1</sup> Representative claim 1 recites (with the relevant limitation shown in boldface):

1. A buoy for mooring vessels comprising:
  - a shell having an outer surface with a pocket defined therein, the pocket configured to maintain a fastening device below a plane of the outer surface in a direction of a midpoint of the buoy such that a vessel moored to the buoy is shielded from contact by the fastening device;
  - a buoyant element retained within the shell to provide flotation; and

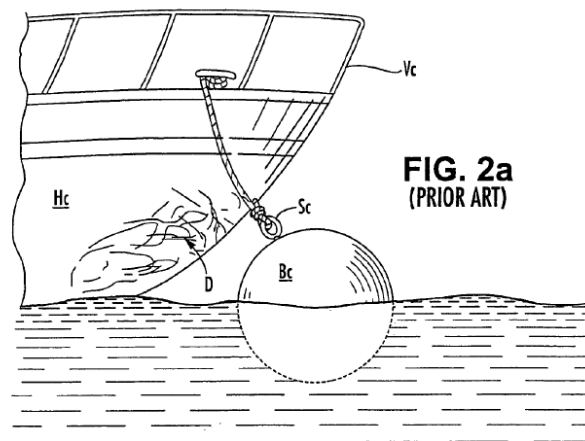
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<sup>1</sup> In an effort to streamline the issues in this appeal, CWI has opted not to appeal claims 25-34, which pertain to a method of manufacturing a buoy.

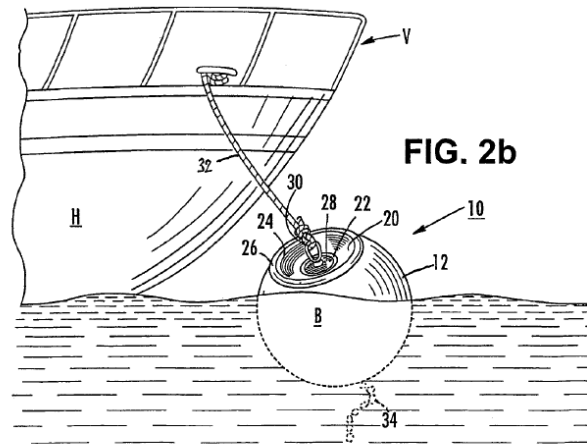
a support plate disposed in the pocket, **the fastening device connected to the support plate such that an external force acting on the fastening device is diffused by the support plate.**

A38 at 6:12-24 (emphasis added).

As the '574 patent explains, one drawback of conventional mooring buoys is that they can damage a boat hull if the hull comes into contact with the buoy shackle. This is illustrated in Figure 2a (A33) of the patent:



The '574 patent solves this problem by nesting the shackle completely below the upper surface of the buoy, as shown in Figure 2b (*id.*) of the patent:



The '574 patent also discloses a “complementary shaped support plate 28 [that] is seated in the support plate pocket 22 to protect other components of the buoy 10 from external forces.” A36 at 2:45-59. For example, in the embodiment shown in Figure 2b, shackle 30 and anchor chain 34 are both connected to support plate 28, and line 32 is fastened to shackle 30. In this configuration, “as the line 32 and the anchor chain 34 move due to external forces, they act on the support plate 28 rather than other components of the buoy 10.” A36 at 2:56-59.

The '574 patent also discloses an embodiment having “a passage or core 16 [that] is coaxially aligned with the centerline CL of the buoy 10.” A37 at 3:58-59; *see also* A34 (Fig. 3). “A pipe or tube 18 [is] inserted in the core 16 and is therefore also coaxially aligned with the centerline . . .” A37 at 3:62-63. “The tube 18 is made from any material such as a hardened plastic . . . a metal, or another suitably hard material made to resist wear and tear by the anchor chain 34

as the anchor chain 34 moves within the tube 18 due to wave or wind action, a motion of the vessel V, or combinations of these external forces.” *Id.* at 4:6-13.

Although the ’574 patent describes and illustrates certain preferred embodiments, such as that shown in Figure 2b, it makes clear that these are not meant to limit the scope of the claims. *See, e.g.*, A36 at 5:62-6:4 (“While preferred embodiments of the invention have been shown and described, those skilled in the art will recognize that other modifications may be made . . .”).

#### **D. The Accused Product**

The accused Sur-Moor Shackle buoy is shown below on the left-hand side, with CWI’s Shackle Pocket Buoy shown on the right-hand side for reference.



A2145.



Like CWI's Shackle Pocket Buoy, Taylor's Sur-Moor Shackle Buoy comprises a polyethylene shell filled with foam, a tube through the center that guides the anchor chain, and a recess at the top of the buoy that allows the anchor shackle to "nest" below the buoy's surface. A2301. Also of particular importance in this appeal, the Sur-Moor Shackle Buoy includes a rolled (i.e., thickened) PVC lip at the top of its central tube that is designed to bear the load of the shackle as it presses down tightly upon the buoy due to the opposing forces of gravity and buoyancy. A2329-32, A2334-38, A2301.

CWI's expert, Mr. Horner, described the rolled PVC lip in the accused buoy as a "PVC support plate," which he further described as follows:

The PVC support plate is formed by a rolled section of the PVC tube at the base of the pocket. Three photos of a section through this part of the Taylor Made buoy are shown below with the items identified along with a shackle shown in two different orientations.

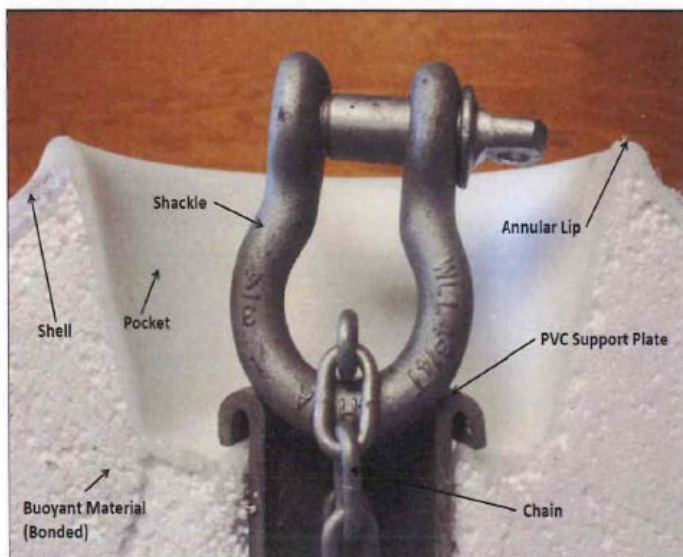


Figure 3

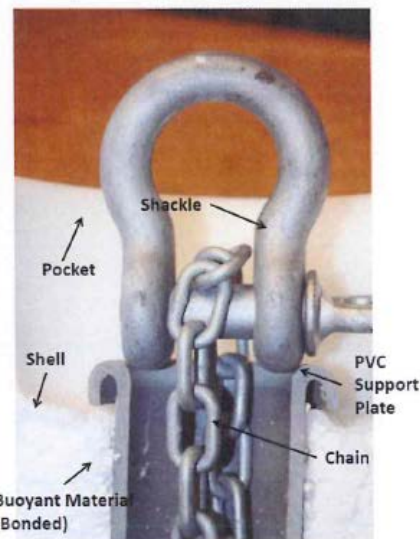


Figure 4

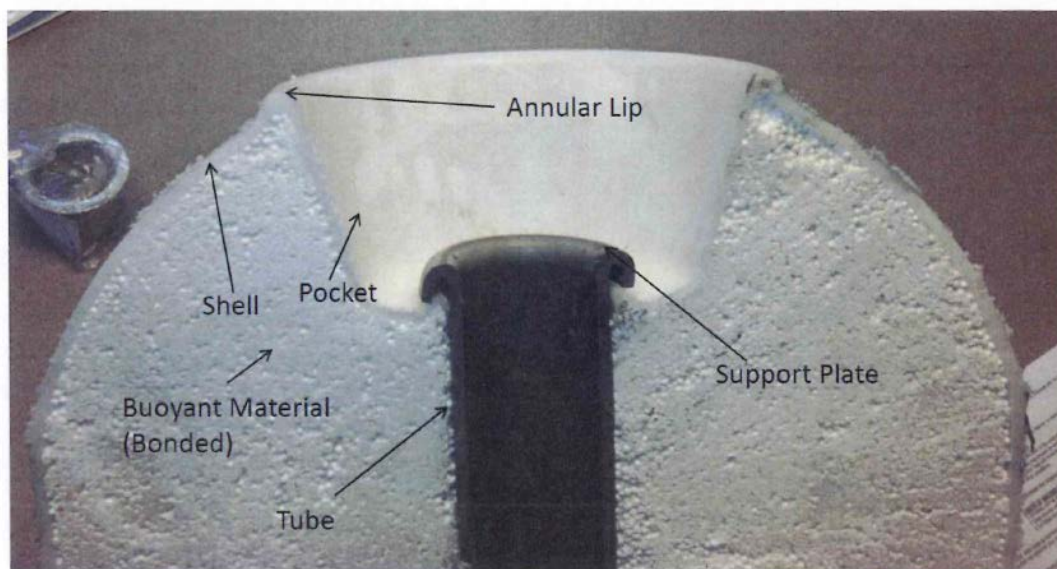


Figure 5

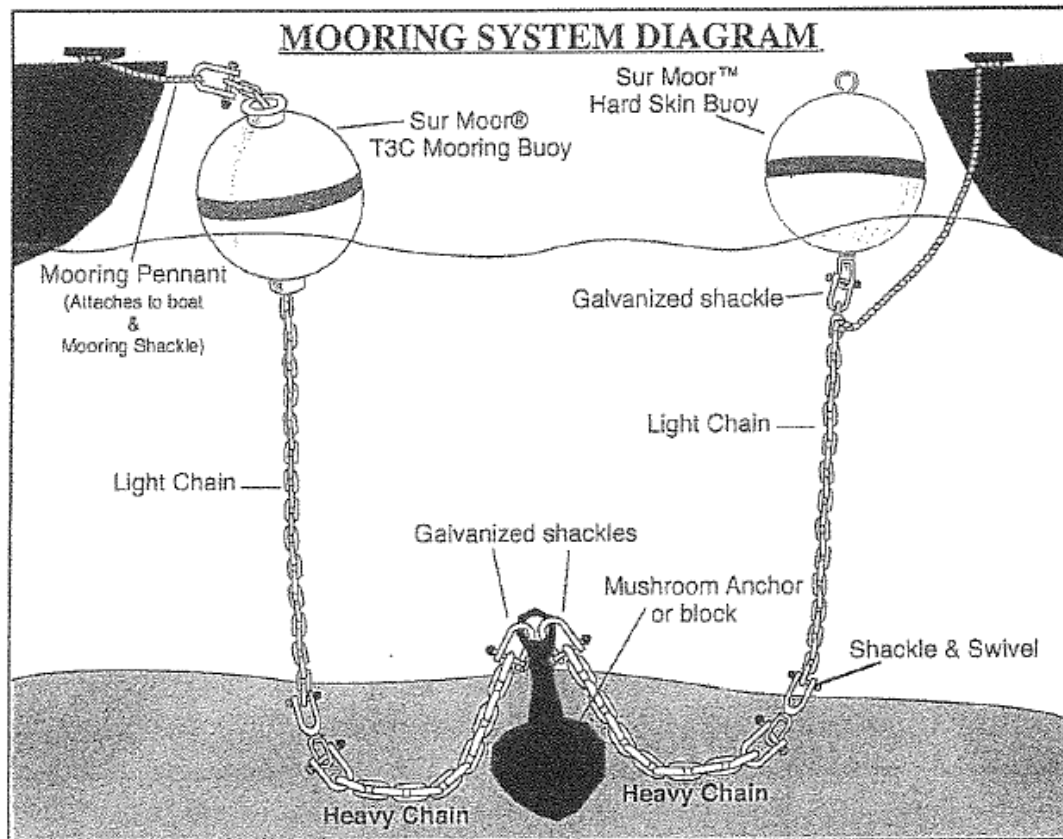
A2437-38.

As will be explained further below, the primary issue in this appeal is whether a shackle (as shown in the upper two pictures) is “connected” to the rolled

PVC lip of the accused Sur-Moor Shackle buoy during normal use, as that term has been properly construed.

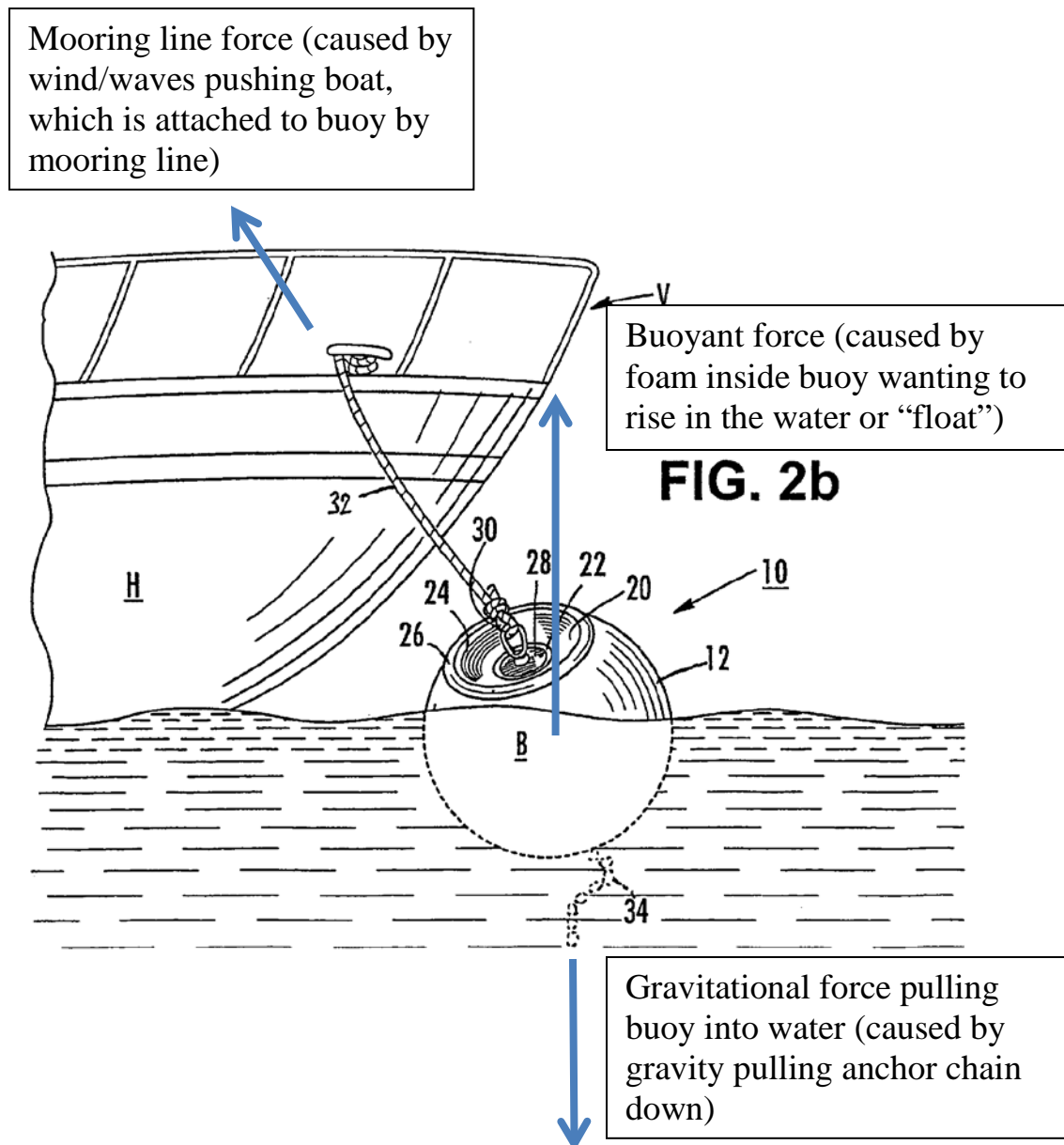
**E. Overview of the Various Forces Acting on a Buoy**

As illustrated in the '574 patent (A31-39), and as further explained in the declaration and expert report of Mr. Horner (A2307-11, A2426-55) and in Taylor's promotional materials (A2302-04), a buoy is typically secured to an anchor at the bottom of a body of water by an anchor chain. Typically, there is sufficient slack in the anchor chain to account for varying environmental conditions, such as tides and waves. Depending on the type of arrangement and the particular environmental conditions, there may be enough slack in the anchor chain that a portion of it lays flat on the ground underwater, as shown in the illustration below from Taylor's webpage:



A2304. As is apparent from the above illustration, the more anchor-chain slack that is pulled off the bottom (e.g., by a rising tide or movement of the moored vessel), the heavier the suspended chain becomes and the more it pulls down on the buoy.

The anchor chain thus exerts a downward gravitational force on the buoy, which can vary depending on how much slack is pulled out of the chain. This downward force is opposed at all times by the force of buoyancy, which exerts an upward force equal to the weight of water displaced by the buoy. These opposing forces are illustrated below, using Figure 2b of the '574 patent as a guide:



## F. Course of Proceedings Below

### 1. Taylor's Motion for Summary Judgment of Non-Infringement and CWI's Opposition

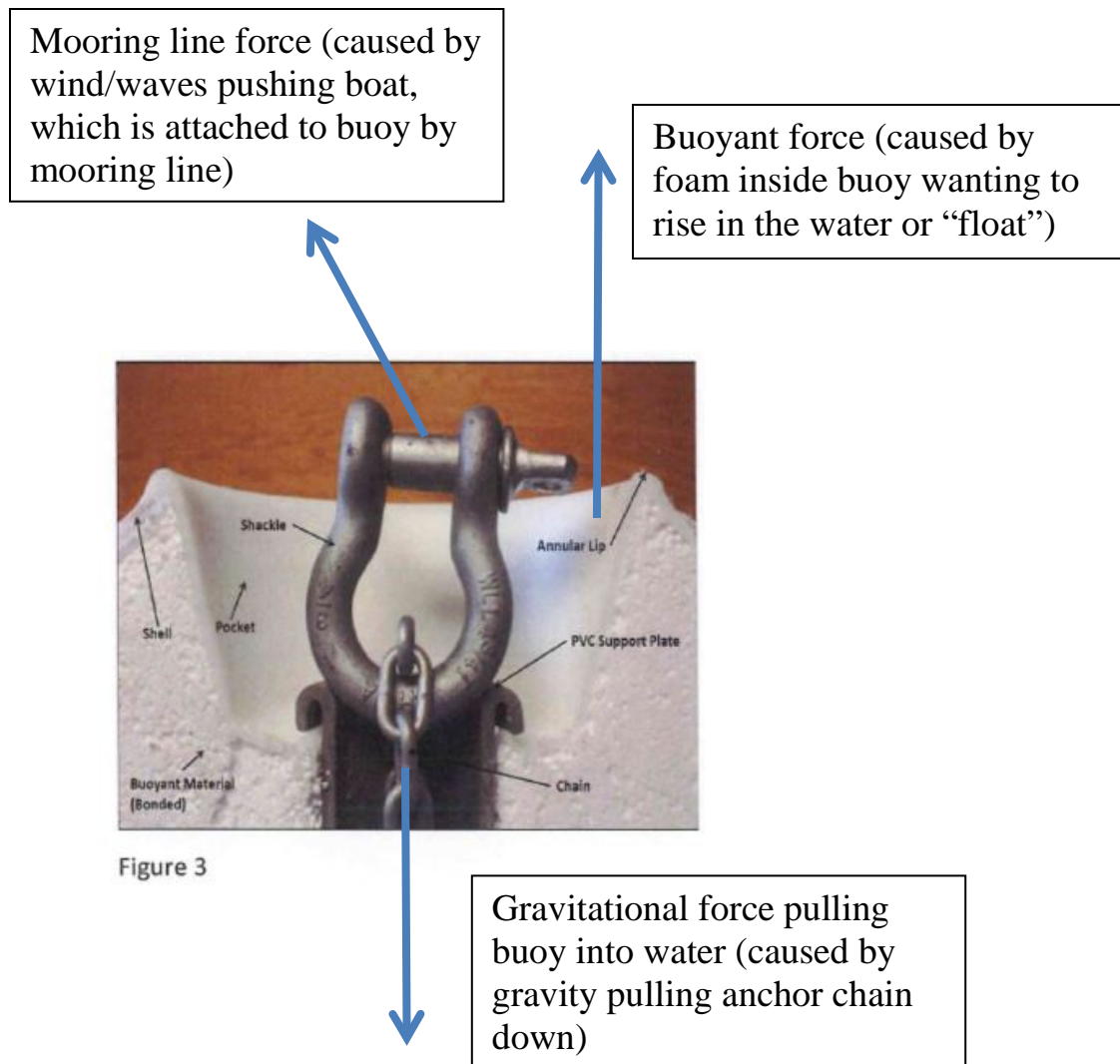
On August 28, 2013, Taylor filed a combined motion for claim construction and summary judgment of non-infringement. In its summary judgment motion, Taylor argued that the accused Sur-Moor Shackle buoy cannot directly infringe

any claim of the '574 patent because it does not have a “support plate” under Taylor’s proposed construction. A11. Taylor’s construction would have defined “support plate” to mean “[a] flat, thin plate seated in and attached to the bottom of an indentation or pocket in a mooring buoy which is also attached to a mooring line via a fastening device, e.g., a shackle, and sometimes to an anchor chain, such that external forces are diffused and act upon such plate rather than on other buoy components.” A8.

CWI opposed Taylor’s proposed construction of “support plate”—particularly the extraneous “flat/thin” requirement—as being unduly narrow and improperly importing limitations into the claims. CWI instead proposed to construe “support plate” to mean “a component that is disposed in the pocket in a mooring buoy and connected to a fastening device, e.g. a shackle, such that a force acting on a fastening device or a line is diffused by the support plate before being transferred to the body or shell of the buoy.” *Id.* CWI argued that, under this construction, the rolled PVC lip at the bottom of the nesting cavity in Taylor’s Sur-Moor Shackle buoy constitutes a “support plate” because it connects to the shackle (i.e., the shackle and the PVC lip are pressed tightly together during normal use) and diffuses forces applied to the shackle. A2249-52, A2308-09. CWI also argued in the alternative that Taylor’s Mooring Collar (sold separately) constitutes a “support plate” when inserted into the buoy. Because these material facts were in

dispute, CWI argued that summary judgment was precluded as a matter of law. A2252, A2308-09.

In support of its opposition to Taylor's motion for summary judgment, CWI submitted a sworn declaration (A2307-11) and expert report (A2426-55) of Robert L. Horner, a registered Professional Engineer with twenty-five years of experience in "structural design, materials testing, marine construction, rigging, and general engineering" (A2430), including specific expertise in "the marine environment, mooring, and loads and forces that can be part of various aspects of buoys and moorings" (*id.*). Mr. Horner examined several of the accused Sur-Moor Shackle buoys and dissected one of them as part of his analysis. Based on his engineering expertise and his specific analysis in this case, he calculated that the combined gravitational and buoyant forces pressing the shackle into the rolled PVC lip in the accused buoy would be approximately 50 pounds under normal conditions and up to 100 pounds during transient conditions. A2435. This concept is illustrated below, using one of Mr. Horner's photographs as a guide:



A2431-32, 2434-38. Thus, it was Mr. Horner's informed, expert opinion that the shackle and the rolled PVC lip in the accused buoys are pressed tightly together during normal use with a force of at least 50 pounds. *Id.*

Mr. Horner further opined that the purpose of the “thickened” PVC lip in the accused buoys is to distribute the forces acting on the shackle to prevent damage to the body of the buoy:

The Taylor Made Buoy includes a thickened plastic or PVC support plate which serves to distribute the load



between the shackle and the buoy shell. The top, rolled section of the tube through the center of the buoy acts as a support plate to add strength to the area contacted by the shackle.

A2434-35.

## 2. The District Court's Decision

On January 9, 2014 the district court issued its decision on Taylor's combined motion for claim construction and summary judgment. A4-16. Regarding the proper construction of "support plate," the district court rejected Taylor's attempt to import a "flat/thin" requirement. A9. Instead, the court construed "support plate" to mean "a component that is seated and secured in the pocket in a mooring buoy and that is also attached to a fastening device, e.g., a shackle, such that external forces are diffused and act upon the support plate rather than the buoy components."<sup>2</sup> *Id.* The district court also adopted CWI's construction of "connected" as meaning "mated, coupled or linked together such that a force can be transferred from one component to another." *Id.* During oral argument, Taylor's counsel agreed that this construction is correct. (*Id.*)

Despite largely adopting CWI's proposed claim constructions, the district court nevertheless granted summary judgment of non-infringement in Taylor's

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<sup>2</sup> It should be noted that all of the claims on appeal require a support plate that is "connected" (not "attached") to the fastening device. A38-39. The district court construed "connected" and "attached" differently and acknowledged that some of the claims use "connected" versus "attached." *See* A9-10 (construing terms).

favor. In doing so, the district court did not focus on the structure of the rolled PVC lip, nor did it determine whether this lip constitutes a “support plate.” Instead, the court concluded that “*even if*” this structure constitutes a “support plate,” there still could not be infringement because each of the asserted claims requires that the support plate be “connected” (claims 1-24 and 35) or “attached” (claims 25-34) to a fastening device and, according to the court, these limitations are not satisfied in the accused Sur-Moor Shackle buoy:

Even if the court were to find that the Shackle Buoy, alone or in combination with the Mooring Collar, did include a support plate, Taylor still would not have committed infringement.

\*\*\*\*\*

Though CWI argues to the contrary, the anchor chain and the PVC sleeve inside Taylor’s Shackle Buoy are neither “connected” nor “attached” by way of the friction between them.

A11-12.

Nowhere in its decision, however, did the court acknowledge the expert opinion of Mr. Horner that the shackle in the accused Sur-Moor buoy is pressed down upon the rolled PVC lip with at least *50 pounds* of force during normal use and that the rolled PVC lip is designed to diffuse these forces to prevent damage to the buoy body. Nor did the court make any reference to the undisputed construction of “connected,” which does *not* require that the support plate and the shackle be rigidly fixed to each other but, instead, requires only that they be

“mated, coupled or linked together such that a force can be transferred from one component to another.” A9.

The court entered final judgment pursuant to Rule 54(b) on March 13, 2014, (A1-2), and CWI timely filed a notice of appeal on March 17, 2014, (A30).

### **III. SUMMARY OF ARGUMENT**

A genuine issue of material fact precludes summary judgment in this case, namely whether the shackle in the accused Sur-Moor Shackle buoy is “connected” to the rolled PVC lip at the bottom of the shackle pocket. Although the court correctly construed “connected” to mean “mated, coupled or linked together such that a force can be transferred from one component to another,” it failed to apply this construction during its infringement analysis. Specifically, CWI presented evidence, including the testimony of a registered Professional Engineer, showing that the opposing forces of gravity and buoyancy in the accused buoy cause the shackle to press tightly against the rolled PVC lip, such that forces acting on the shackle are transferred to the rolled PVC lip. This satisfies the agreed-upon definition of “connected.”

The district court, however, failed to view this evidence in the light most favorable to CWI and failed to draw reasonable inferences in CWI’s favor. Instead, the court summarily concluded—apparently based on its own lay understanding of the forces involved—that because the anchor chain and mooring

line are both directly attached to the shackle in the accused buoy, the shackle cannot possibly be “connected” to the rolled PVC lip of the buoy, even though the shackle presses tightly against this lip during normal use. This is simply wrong as a matter of physics, and it is *certainly* wrong as a matter of law because the Supreme Court has made clear that summary judgment can only be properly granted when no genuine issues of material fact remain.

#### **IV. ARGUMENT**

##### **A. Standard of Review**

Summary judgment is appropriate only if “the movant shows that there is no genuine dispute as to any material fact and the movant is entitled to judgment as a matter of law.” Fed. R. Civ. P. 56(a). This Court reviews a “district court’s grant or denial of summary judgment under the law of the regional circuit.” *MicroStrategy Inc. v. Bus. Objects, S.A.*, 429 F.3d 1344, 1349 (Fed. Cir. 2005). In the Fourth Circuit, the grant of a summary judgment motion is reviewed de novo. *Laber v. Harvey*, 438 F.3d, 404, 415 (4th Cir. 2006).

In reviewing a summary judgment motion, credibility judgments and weighing of the evidence are prohibited. Rather, the evidence must be viewed in the light most favorable to the non-moving party. *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 255 (1986); *Monarch Knitting Mach. Corp. v. Sulzer Morat GmbH*, 139 F.3d 877, 880 (Fed. Cir. 1998). Thus, the facts and any inferences that can be

drawn from those facts must be viewed in the light most favorable to the non-moving party. *Matsushita Elec. Indus. Co. v. Zenith Radio Corp.*, 475 U.S. 574, 587 (1986).

**B. The District Court Improperly Resolved a Disputed Issue of Fact as to Whether Two Parts of the Accused Buoy Are “Connected”**

The district court summarized the parties’ summary-judgment arguments as follows:

At bottom, Taylor argues that its products have no support plates, that support plates are a key limitation included in the ’574 Patent, and that Taylor’s products cannot, therefore, infringe the ’574 Patent. CWI responds that the Shackle Buoy does contain a support plate, namely the PVC tube that runs through the center of the Taylor buoys.<sup>3</sup>

(A11.)

After considering the parties’ proposed constructions of “support plate,” the district court construed that term as follows:

<b>Taylor’s Proposed Construction</b>	<b>CWI’s Proposed Construction</b>	<b>District Court’s Construction</b>
“a flat, thin plate seated in and attached to the bottom	“a component that is disposed in the pocket in	“a component that is seated and secured in the

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<sup>3</sup> To be precise, CWI argued that the thickened PVC lip that protrudes into the shackle pocket and provides a contact point for the shackle constitutes a “support plate” under the correct construction. A2250-51. CWI also argued, in the alternative, that the Mooring Collar constitutes a “support plate” when inserted by a user into the tube. A2252.

of an indentation or pocket in a mooring buoy which is also attached to a mooring line via a fastening device, e.g., a shackle, and sometimes to an anchor chain, such that external forces are diffused and act upon such plate rather than on other buoy components.”	a mooring buoy and connected to a fastening device, e.g. a shackle, such that a force acting on a fastening device or a line is diffused by the support plate before being transferred to the body or shell of the buoy.”	pocket in a mooring buoy and that is also attached to a fastening device, e.g., a shackle, such that external forces are diffused and act upon the support plate rather than the buoy components.”
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A8-9.

With one minor exception, the district court’s construction of “support plate” is correct. The minor exception is that not all the claims of the ’574 patent require the support plate to be “attached” to a fastening device; instead, some claims require that it be “connected.” In fact, *all* of the claims on appeal—i.e., claims 1-24 and 35—require that the support plate be “connected” to a fastening device, not “attached.” A38-39. Accordingly, as to these claims, the district court’s construction should be slightly modified to require “connected” instead of “attached.” The district court acknowledged this distinction when it later stated that “[t]he ’574 Patent claims a buoy with a shackle that is *connected or attached* to a support plate . . .” A11 (emphasis added).

The Court construed “connected” according to its conventional, agreed-upon meaning:

At the hearing, Taylor’s counsel agreed to adopt CWI’s proposed construction of the term “connected.” . . . The

Court therefore construes the term “connected” to mean “mated, coupled or linked together such that a force can be transferred from one component to another.”

A9. This agreed-upon construction, which does not require a direct or rigid attachment, is consistent with the ordinary meaning of “connected.” *See, e.g., Douglas Dynamics, LLC v. Buyers Prods. Co.*, 717 F.3d 1336, 1342-43 (Fed. Cir. 2013) (reversing summary judgment of non-infringement because the district court’s construction of “connected” was too narrow, and noting that “[t]he ordinary meaning of ‘connected to’ encompasses indirect linkages”); *Genentech, Inc. v. Chiron Corp.*, 112 F.3d 495, 501 (Fed. Cir. 1997) (“To be joined or connected does not necessitate a *direct* joining or connection.”) (emphasis in original); *accord Am. Piledriving Equip., Inc. v. Bay Mach. Corp.*, 632 F.Supp.2d 956, 967 (N.D. Cal. 2009) (“Ordinarily . . . ‘connected’ means ‘conjoined; fastened or linked together.’”) (citing Oxford English Dictionary (2d ed. 1989)).

Having resolved the meaning of “support plate” and “connected,” the district court next turned to the question of whether the accused Sur-Moor buoy meets the “support plate” limitation. In deciding this issue, the court focused not on the structural aspects of the support plate but, rather, on the requirement that it be “connected or attached” to a fastening device such as a shackle. Specifically, the court held:

Even if the court were to find that the Shackle Buoy, alone or in combination with the Mooring Collar, did

include a support plate, Taylor still would not have committed infringement. The '574 patent claims a buoy with a shackle that is connected or attached to a support plate, which in turn is connected or attached to an anchor chain. A person using CWI's invention attaches the boat's mooring line to the CWI buoy's support plate via a shackle, and the anchor chain has previously been securely fastened to the opposite side of the support plate. See '574 Patent claim 17, col. 7, lines 3, 16-17 . . . Taylor's Shackle Buoy and Mooring Collar work differently. A person who uses a Shackle Buoy, with or without a Mooring Collar, connects the boat's mooring line directly to the anchor chain. This is a fundamentally different usage than the one described in the specification and claims of the '574 Patent. . . . Though CWI argues to the contrary, the anchor chain and the PVC sleeve inside Taylor's Shackle Buoy are neither "connected" nor "attached" by way of the friction between them.

A11-12. There are several fundamental errors in this analysis.

**First**, it is not correct that "[t]he '574 patent claims a buoy with a shackle that is connected or attached to a support plate, *which in turn is connected or attached to an anchor chain.*" *Id.* (emphasis added). Although claims 17-24 recite an anchor chain connected to the support plate, the other claims do not. For instance, claims 1, 3-15, and 35 do not recite an anchor line at all; and although claims 2 and 16 recite a "line to anchor the buoy," they do not require that it be connected to the support plate. The district court's overbroad summary of what the *entire* '574 patent allegedly "claims" and the court's comparison of the accused product to a preferred embodiment of the invention contradict this court's frequent admonition that it is the claims of a patent that define the invention, not the



specification. *Philips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005). Each claim of a patent must be analyzed separately, taking full account of its unique limitations. *Allen Eng'g. Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1353 (Fed. Cir. 2002). There is no so-called “heart” or “gist” of an invention, as the district court seemed to suggest here. *Id.* at 1345, citing *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 365 U.S. 336, 345 (1961).

**Second**, it is also incorrect that connecting a mooring line directly to an anchor chain is a “fundamentally different usage than the one described in . . . the claims of the ’574 Patent.” As explained above, many of the claims do not even recite an anchor line, and *none* of them precludes connecting both a mooring line and an anchor line to a shackle, which in turn presses tightly down upon and transfers forces to a support plate. In such a configuration, the anchor line is “connected” to the support plate via the shackle, in the same indirect manner that a person using a CWI buoy “attaches the boat’s mooring line to the CWI buoy’s support plate *via a shackle*.” A12 (emphasis added).

**Third**, the district court clearly failed to view the facts in the light most favorable to CWI, the non-movant. This is evident, for instance, in the court’s cursory statement that, “[t]hough CWI argues to the contrary, the anchor chain and the PVC sleeve inside Taylor’s Shackle Buoy are neither ‘connected’ nor ‘attached’ by way of the friction between them.” *Id.* (emphasis added). To begin

with, this statement does not even correctly summarize the issue. CWI's argument was that the *shackle* in Taylor's Shackle Buoy is connected to the *rolled lip* of the PVC sleeve, which is purposely thickened for strength and protrudes into the shackle pocket for the specific purpose of making contact with the shackle. *See* A2309 at ¶¶ 5-7. The district court's rewording makes it sound as if CWI argued that the anchor chain and the PVC sleeve are somehow connected "*inside* Taylor's Shackle Buoy." A12 (emphasis added). This was never CWI's argument.

Moreover, CWI did not merely "argue to the contrary" as the district court suggested; CWI submitted a *detailed factual report* of a registered Professional Engineer with twenty-five years of experience in "structural design, materials testing, marine construction, rigging, and general engineering," including specific expertise in "the marine environment, mooring, and loads and forces that can be part of various aspects of buoys and moorings." A2430. Mr. Horner physically examined the accused Sur-Moor buoy and calculated that, under normal conditions, the shackle is tightly pressed down upon the rolled PVC lip at the bottom of the shackle pocket with at least 50 pounds of force. A2435; *see also* A2436 (opining that transient loads could be as high as 100 pounds). He explained that "[t]his force is created by the combination of the buoyancy of the buoy combined with the anchor and connecting chain . . . ." A2431. Clearly, if the district court had accepted these facts as true, i.e., that the shackle and the rolled

PVC lip in Taylor's buoy are pressed tightly together with at least 50 pounds of force during normal conditions, it should have concluded that a reasonable jury could find that this configuration satisfies the "connected" limitation as properly construed.

This leads to the *fourth* defect in the district court's infringement analysis. Namely, the court nowhere referred to its construction of "connected" during its entire infringement analysis. As explained above, the district court correctly construed "connected" to mean "mated, coupled or linked together such that a force can be transferred from one component to another." A9. According to this Court's guidance, this properly construed limitation should then have been compared to the accused device to determine if the limitation is satisfied. *See Cybor Corp. v. FAS Techs., Inc.*, 138 F.3d 1448, 1454 (Fed. Cir. 1998) (en banc). Yet, here, the district court failed to analyze whether the shackle and the rolled PVC lip in the accused Sur-Moor buoy—which Mr. Horner calculated are pressed together with at least *50 pounds* of force during normal conditions—are "mated, coupled or linked together such that a force can be transferred from one component to another." *See* A10-13 (district court's infringement analysis never referring to this construction). The district court's failure to apply its own claim construction during the infringement analysis was erroneous as a matter of law. *See Allen Eng'g*, 299 F.3d at 1346.

In sum, the district court committed several errors during its infringement analysis which ultimately led it to improperly decide a disputed issue of material fact, namely whether the shackle and the rolled PVC lip in the accused Sur-Moor buoy are “connected.”

**C. The District Court Failed to View the Evidence in the Light Most Favorable to CWI, the Non-Movant**

As explained above, in support of its opposition to Taylor’s motion for summary judgment, CWI submitted a sworn declaration and an expert report of Robert L. Horner, a registered Professional Engineer and a member of Weston & Sampson Environmental/Infrastructure Consultants, located in Columbia and Charleston, South Carolina. Mr. Horner physically inspected several of the accused Sur-Moor Shackle buoys and performed calculations based upon his expertise and his twenty-five years of engineering experience. A2307-11; A2426-55.

Regarding the rolled PVC lip in the accused Taylor buoy, Mr. Horner opined:

The Taylor Made Buoy includes a thickened plastic or PVC support plate which serves to distribute the load between the shackle and the buoy shell. The top, rolled section of the tube through the center of the buoy acts as a support plate to add strength to the area contacted by the shackle.

A2434-35.

Mr. Horner calculated that, “[b]ased on an 18” buoy with 50% submergence, the static or constant load on the anchor line which is transferred to the buoy at the two contact points where the shackle meets the PVC support plate is 50 pounds divided between the two contact points.” A2435. He also explained that “with wave action, currents, tides, boat wakes and mooring activities, the buoy will be subjected to periods of submergence that exceed 50% of the Buoy volume,” and that “[t]he additional loads on the 18” buoy can increase up to 100 pounds based on full submergence.” A2436.

Thus, based on Mr. Horner’s analysis and calculations, the shackle in the accused Taylor buoy will be tightly pressed against the rolled PVC lip with at least 50 pounds of force during normal conditions and up to 100 pounds of force during transient conditions. This rolled PVC lip “serves to distribute the load between the shackle and the buoy shell,” i.e., it diffuses the 50-100 pounds of force acting on the shackle to prevent damage to the body of the buoy. A2434-35.

The district court should have accepted all of these facts as true and should have drawn all reasonable inferences from these facts in CWI’s favor. *Matsushita*, 475 U.S. at 587. One such reasonable inference is that the shackle in the accused buoy is “mated, coupled or linked” to the rolled PVC lip in such a way that “a force can be transferred from one component to another.” This is the agreed-upon definition of “connected.”

Rather than accepting Mr. Horner’s factual analysis as true, however, the district court ignored it. Indeed, the district court did not cite Mr. Horner’s expert declaration or his expert report *a single time* in its summary judgment decision. Quite the opposite, on the critical question of whether the shackle in the accused Sur-Moor buoy is “connected” to the PVC annular lip or the Mooring Collar, the district court relied exclusively upon a declaration of Mr. DeRuscio (a Taylor employee), which was submitted by Taylor, the *movant*. A12 (citing “DeRuscio Decl. ¶ 4”). This weighing of the evidence on summary judgment—particularly in the movant’s favor—constitutes legal error *per se*. *See Anderson*, 477 U.S. at 255 (“Credibility determinations, the weighing of the evidence, and the drawing of legitimate inferences from the facts are jury functions, not those of a judge, whether he is ruling on a motion for summary judgment or for a directed verdict.”); *accord Metropolitan Life Ins. Co. v. Bancorp Svcs., L.L.C.*, 527 F.3d 1330, 1338-39 (Fed. Cir. 2008) (vacating summary judgment of non-infringement because the district court improperly credited evidence presented in movant’s affidavit over that presented in non-movant’s affidavit).

**D. Because the District Court Erred in Granting Summary Judgment of No Direct Infringement, It Also Erred in Granting Summary Judgment of No Indirect Infringement**

CWI’s complaint in this case alleged both direct and indirect infringement. A2599-601. Regarding indirect infringement, CWI’s complaint alleged, *inter alia*,

that Taylor “instruct[s] and encourag[es] third parties to combine Taylor Made buoys and hardware to infringe at least one claim of the ’574 Patent.” A2600 at ¶ 13. The complaint further alleged that: “Taylor Made is selling and/or offering for sale in the United States and in this district certain buoys specifically adapted for use in the infringement of the ’574 Patent. Taylor Made knows that these buoys are especially made for and/or especially adapted for use in practicing one or more claims of the ’574 Patent.” A2601 at ¶ 15. The district court’s summary judgment ruling focused on just one subset of CWI’s indirect infringement case, namely its alternative argument that the combination of Taylor’s Sur-Moor Shackle Buoy and its T3C Mooring Collar by customers constitutes direct infringement, which, in turn, constitutes contributory and/or induced infringement on Taylor’s part.

Regarding this particular inducement argument, the district court ruled as follows:

The court has already found that Taylor’s Shackle Buoy and Mooring Collar, even when used in combination, do not directly infringe the ’574 Patent. As a result there can be no induced infringement. Moreover, while CWI provides invoices from a third party marine supply business that indicate that some customers have ordered a Shackle Buoy and a Mooring Collar at the same time . . . this evidence does not establish specific instances of direct infringement.

A14.

Because the district court's inducement ruling was based primarily on its erroneous finding of no direct infringement, if this Court vacates that finding, it should also vacate the district court's ruling on inducement. As for the district court's dismissal of CWI's evidence based on customer invoices, this, too, was improper because CWI is entitled to *all* reasonable inferences based on this proffered evidence, and the invoices strongly suggest that at least some customers use Taylor's Sur-Moor Shackle Buoy and the TC3 Mooring Collar together.

Regarding contributory infringement, the district court ruled as follows:

Because the Shackle Buoy, used alone or in combination with the Mooring Collar, does not directly infringe the '574 Patent, Taylor cannot have committed contributory infringement. Additionally, the Mooring Collar has a substantial non-infringing use, that is, to reinforce the neck of any Taylor buoy that contains a tube through its center.

A15.

Again, because the district court's contributory-infringement ruling is based largely on its erroneous finding of no direct infringement, if this Court vacates that finding, it should also vacate the district court's ruling on contributory infringement. The district court's additional comment about the alleged substantial non-infringing use of the Mooring Collar is irrelevant because it is Taylor's Sur-Moor Shackle Buoy, *not* the Mooring Collar, that has no substantial non-infringing use. As CWI clearly and unambiguously alleged in its complaint, "these *buoys* are



especially made for and/or especially adapted for use in practicing one or more claims of the '574 Patent.” A2600at ¶ 15 (emphasis added); *see also* A1062. The question of whether the accused *buoy* has a substantial non-infringing use turns, in part, on whether the shackle is “connected” to the support plate during normal use, which is a disputed issue of material fact precluding summary judgment.

## V. CONCLUSION

For the reasons explained above, this Court should vacate the district court’s summary judgment ruling of no direct and indirect infringement and remand for further proceedings not inconsistent with this Court’s ruling.

Respectfully submitted,

May 19, 2014

/s/ James R. Barney

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## **ADDENDUM**

**U.S. District Court  
 District of South Carolina (Charleston)  
 CIVIL DOCKET FOR CASE #: 2:12-cv-02568-DCN**

Carolina Waterworks Inc v. Taylor Made Group LLC et al  
 Assigned to: Honorable David C Norton  
 Case in other court: Court of Appeals for the Federal Circuit, 14-01362  
 Cause: 28:1338 Patent Infringement

Date Filed: 09/06/2012  
 Jury Demand: Both  
 Nature of Suit: 830 Patent  
 Jurisdiction: Federal Question

Date Filed	#	Docket Text
03/13/2014	76	<b>TEXT ORDER:</b> Pursuant to the parties' agreement on these issues, the court hereby GRANTS <u>71</u> plaintiff's motion for entry of final judgment and further STAYS all proceedings related to defendant's counterclaims pending the resolution of plaintiff's appeal of <u>62</u> the court's order granting summary judgment of non-infringement. Signed by Honorable David C Norton on 03/13/2014. (gcle, 3/13/14) (Entered: 03/13/2014)

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PACER Login:	fh0018	Client Code:	99001.0005-00000/1291
Description:	Docket Report	Search Criteria:	2:12-cv-02568-DCN Starting with document: 76 Ending with document: 76
Billable Pages:	1	Cost:	0.10



## UNITED STATES DISTRICT COURT

for the

District of South Carolina

Carolina Waterworks, Inc.*Plaintiff*

v.

Taylor Made Group, LLC and Taylor Made Products*Defendants*

Civil Action No. 2:12-cv-02568-DCN

## JUDGMENT IN A CIVIL ACTION

The court has ordered that (*check one*):☐ the plaintiff☐ the plaintiff recover nothing, the action be dismissed on the merits, and the defendant (*name*) \_\_\_\_\_recover costs from the plaintiff (*name*) \_\_\_\_\_.☒ other: The court grants defendants' motion for Markman claim construction and for summary judgment of non-infringement.This action was (*check one*):☐ tried by a jury, the Honorable \_\_\_\_\_ presiding, and the jury has rendered a verdict.☐ tried by the Honorable \_\_\_\_\_ presiding, without a jury and the above decision was reached.☒ decided by the Honorable David C. Norton, United States District Judge, on a motion for summary judgment.

Date: January 9, 2014

CLERK OF COURT

s/John P. Bryan, Jr.

\_\_\_\_\_  
*Signature of Clerk or Deputy Clerk*

**IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF SOUTH CAROLINA  
CHARLESTON DIVISION**

CAROLINA WATERWORKS, INC.,	)	
	)	
Plaintiff,	)	No. 2:12-CV-02568-DCN
	)	
v.	)	
	)	<b>ORDER</b>
TAYLOR MADE GROUP, LLC, <i>et al.</i> ,	)	
	)	
	)	
Defendants.	)	
	)	

This matter is before the court on a motion for Markman claim construction and for summary judgment of non-infringement filed by defendants Taylor Made Group, LLC and Taylor Made Products (collectively, “Taylor”), ECF No. 34. Also pending is a motion for partial summary judgment filed by plaintiff Carolina Waterworks, Inc. (“CWI”), ECF No. 57. For the reasons stated below, the court grants summary judgment in Taylor’s favor and declares that Taylor does not infringe any claim of U.S. Patent No. 6,955,574 (“the ’574 Patent”), a patent for a shackle pocket buoy held by CWI. Because the court grants summary judgment in Taylor’s favor, the court denies CWI’s motion for partial summary judgment.

**I. BACKGROUND**

CWI is a South Carolina corporation with a principal place of business in Goose Creek. Am. Compl. ¶ 1. L. Keith Rogerson, the inventor of the ’574 Patent, assigned the patent’s rights to CWI. Am. Compl. ¶ 7. Taylor Made Group, LLC is a limited liability company organized under the laws of Delaware that does business throughout the United States, including South Carolina. Am. Compl. ¶ 3. Taylor Made Products is an

unincorporated division of Taylor Made Group, LLC. Answer ¶ 2. Both Taylor Made Group, LLC and CWI sell recreational marine products.

On September 6, 2012, CWI filed a complaint in this court, alleging patent infringement against Taylor. CWI filed an amended complaint on January 4, 2013. CWI's amended complaint alleges that Taylor's Sur-Moor Shackle Buoy ("the Shackle Buoy"), alone and in combination with Taylor's T3C Mooring Collar ("the Mooring Collar"), infringe on the '574 Patent. Am. Compl. ¶ 13. Taylor denies that the Mooring Collar is compatible with – much less sold in conjunction with – the Shackle Buoy, and denies CWI's patent infringement claims. Through a counter-claim filed with its answer on February 19, 2013, Taylor seeks a declaratory judgment of non-infringement.

On August 28, 2013, Taylor filed the pending motion for summary judgment and for Markman claim construction. CWI opposed Taylor's motion on September 16, 2013, and Taylor timely replied. The court held a hearing on the motion on October 10, 2013. One week after the hearing, CWI filed the pending motion for partial summary judgment. All of these matters have been fully briefed and are ripe for the court's review.

## **II. STANDARDS**

In a patent case, the court applies the law of the appropriate regional circuit when determining whether the grant of summary judgment is proper. Sunovion Pharm., Inc. v. Teva Pharm. USA, Inc., 731 F.3d 1271, 1275 (Fed. Cir. 2013). Summary judgment shall be granted "if the movant shows that there is no genuine dispute as to any material fact and that the movant is entitled to judgment as a matter of law." Fed. R. Civ. P. 56(a). "Only disputes over facts that might affect the outcome of the suit under the governing law will properly preclude the entry of summary judgment." Anderson v. Liberty Lobby,

Inc., 477 U.S. 242, 248 (1986). At the summary judgment stage, the court should view the evidence in the light most favorable to the non-moving party and draw all inferences in its favor. Id. at 255.

### **III. DISCUSSION**

Taylor's motion for summary judgment and for Markman claim construction is dispositive of the case. As a result, the court discusses it before briefly turning to CWI's motion for partial summary judgment.

#### **A. Taylor's Motion for Summary Judgment & a Declaration of Non-Infringement**

Taylor seeks summary judgment in its favor, as well as a declaration that it has not infringed the '574 Patent. As the Federal Circuit has explained, determining patent infringement "is a two-step process." Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc., 381 F.3d 1111, 1115 (Fed. Cir. 2004) (citing Markman v. Westview Instruments, Inc., 52 F.3d 967, 976 (Fed. Cir. 1995) (en banc)).<sup>1</sup> First, the court must construe the patent's claims, that is, the court must ascertain the meaning and scope of the patent's claims. Id. Second, the court must compare the properly construed claims to the accused device. Id.

##### **1. Markman claim construction**

Claim construction is the process by which the court determines "the meaning and scope of the patent claims asserted to be infringed." Markman, 52 F.3d at 976. Claim construction is a matter of law that must be decided by the court. Id. at 979. A court must construe the patent's claims before determining whether a patent has been infringed,

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<sup>1</sup> Though the court applies the procedural law of the Fourth Circuit when determining whether summary judgment is appropriate, it must apply the law of the Federal Circuit when construing the claims of the patent or patents at issue.



and must give “the claims the same meaning for purposes of both the infringement and validity analyses.” Z-Man Fishing Prods., Inc. v. Renosky, No. 11-cv-00428, 2012 WL 2264260, at \*3 (D.S.C. Apr. 27, 2012) (citing Amazon.com, Inc. v. Barnesandnoble.com, Inc., 239 F.3d 1343, 1351 (Fed. Cir. 2001)). The words of a claim are generally given “the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention.” Phillips v. AWH Corp., 415 F.3d 1303, 1313 (Fed. Cir. 2005).

When construing a patent’s claims, a court first considers the intrinsic evidence of a claim’s meaning: (1) the claims themselves; (2) the specification;<sup>2</sup> and (3) the prosecution history. Markman, 52 F.3d at 979 (quoting Unique Concepts, Inc. v. Brown, 939 F.2d 1558, 1561 (Fed. Cir. 1991)). After considering the intrinsic evidence, a court may also consider extrinsic evidence – “that evidence which is external to the patent and file history, such as expert testimony, inventor testimony, dictionaries, and technical treatises and articles.” Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1584 (Fed. Cir. 1996); see also Markman, 52 F.3d at 980 (stating that extrinsic evidence may be useful to explain scientific principles, technical terms, terms of art, and the state of the prior art at the time of the invention). Reliance on extrinsic evidence to construe a claim is “proper only when the claim language remains genuinely ambiguous after consideration of the intrinsic evidence.” Bell & Howell Document Mgmt. Prods. Co. v. Altek Sys., 132 F.3d 701, 706 (Fed. Cir. 1997). While judges are encouraged to consult technical treatises and dictionaries when construing a patent’s claims, they cannot employ

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<sup>2</sup> The specification is “a written description of the invention” that is included in the patent application. 35 U.S.C. §§ 111-12.

a dictionary definition that contradicts “any definition found in or ascertained by a reading of the patent documents.” Vitronics Corp., 90 F.3d at 1584 n.6.

The parties agree that the court must construe the following terms contained in the ’574 Patent: “support plate;” “external force;” “connected;” and “attached”/“attaching.”

**a. “Support plate”**

Taylor contends “support plate” should be construed as

A flat, thin plate seated in and attached to the bottom of an indentation or pocket in a mooring buoy which is also attached to a mooring line via a fastening device, e.g., a shackle, and sometimes to an anchor chain, such that external forces are diffused and act upon such plate rather than the buoy components.

Defs.’ Mot. for Summ. J. 11. CWI counters that “support plate” should be construed as

A component that is disposed in the pocket in a mooring buoy and connected to a fastening device, e.g. a shackle, such that a force acting on a fastening device or a line is diffused by the support plate before being transferred to the body or shell of the buoy.

Pl.’s Opp’n to Mot. for Summ. J. 26.

Taylor’s argument to the contrary, the ’574 Patent does not limit itself to a support plate that is flat and thin. While Figures 1 and 3 of the ’574 Patent do show flat, thin plates that are attached to the bottom of a buoy’s shackle pocket, depictions in the patent’s specification are not the exclusive embodiment of the patent. Anchor Wall Sys., Inc. v. Rockwood Retaining Walls, Inc., 340 F.3d 1298, 1306-07 (Fed. Cir. 2003) (“[T]he mere fact that the patent drawings depict a particular embodiment of the patent does not operate to limit the claims to that specific configuration.” (citing Hockerson–Halberstadt, Inc. v. Avia Grp. Int’l, Inc., 222 F.3d 951, 956 (Fed. Cir. 2000))). Similarly, Taylor’s argument that “we all know what a plate is,” Draft Hr’g Tr. 25:15, Oct. 10, 2013, rings

hollow because a claim term's meaning is not necessarily a general dictionary definition. Phillips, 415 F.3d at 1321-22.

For these reasons, the court construes "support plate" as "a component that is seated and secured in the pocket in a mooring buoy and that is also attached to a fastening device, e.g., a shackle, such that external forces are diffused and act upon the support plate rather than the buoy components." This definition recognizes that the support plate must be attached to both the buoy and the shackle but that the support plate need not be flat and thin.

**b. "External force"**

The parties agree that "external force" means "[a] force, e.g., wave action, applied to a mooring buoy via the mooring or anchor line." Defs.' Mot. for Summ. J. 11; Pl.'s Opp'n 30. As a result, the court construes the term "external force" in the manner agreed to by the parties.

**c. "Connected"**

At the hearing, Taylor's counsel agreed to adopt CWI's proposed construction of the term "connected." Draft Hr'g Tr. 23:25-24:3, Oct. 10, 2013. The court therefore construes the term "connected" to mean "mated, coupled or linked together such that a force can be transferred from one component to another."

**d. "Attached" and "Attaching"**

Taylor contends that the words "attached" and "attaching" should be construed to mean "[a] permanent, secure connection such as by adhesives, screws, rivets, bolts, or similar mechanical attachments." Defs.' Mot. for Summ. J. 11. CWI contends that

“attached” and “attaching” should be construed to mean “seated or secured in a way that permits forces to be transferred.” Id. at 29.

Taylor presents an overly-narrow construction of the terms by suggesting that they can only apply to a permanent connection secured by adhesives, screws, rivets, bolts, and the like. On the other hand, CWI’s suggested construction of “attached” and “attaching” is much broader than that found in the ’574 Patent.

The court construes “attached” to mean “securely joined or affixed in a way that permits forces to be transferred.” Similarly, the court construes “attaching” to mean “securely joining or affixing in a way that permits forces to be transferred.” These constructions are supported by the specification, which uses the term “attached” to describe the relationship between components that are secured to each other by welding, adhesives, screws, rivets, bolts or similar mechanical attachments. These constructions are further supported by claim 25, which explains that the shackle is attached to the support plate, and that both the shackle and the support plate are attached within the shackle pocket. Finally, “although [the c]ourt need not consult extrinsic evidence because the intrinsic evidence is clear,” these constructions fall within the dictionary definition of “attach. 180s, Inc. v. Gordini U.S.A., Inc., 699 F. Supp. 2d 714, 721 (D. Md. 2010) (citing Phillips, 415 F.3d at 1324).

## **2. Determining infringement**

Now that the court has construed the disputed claim terms listed above, it must compare Taylor’s allegedly infringing products to the claims of the ’574 patent in order to determine whether infringement has occurred. CWI alleges that Taylor has infringed the ’574 Patent both directly and indirectly.

### **a. Direct infringement**

The court first considers whether Taylor's products directly infringe the '574 Patent. Direct infringement occurs when an entity "makes, uses, offers to sell, or sells any patented invention," without authorization, during the term of the patent. 35 U.S.C. § 271(a). Direct infringement may consist of either literal infringement or infringement under the doctrine of equivalents. Literal infringement occurs when "each and every limitation set forth in a patent claim appears in an accused product." Cross Med. Prods., Inc. v. Medtronic Sofamor Danek, Inc., 424 F.3d 1293, 1310 (Fed. Cir. 2005) (internal quotations omitted). The doctrine of equivalents imposes liability on a party whose accused product or process contains an "insubstantial" change from the claimed invention. TIP Sys., LLC v. Phillips & Brooks/Gladwin, Inc., 529 F.3d 1364, 1376 (Fed. Cir. 2008). The accused product or process is considered equivalent to the patented product or process when the accused device "performs substantially the same function in substantially the same way to obtain the same result." Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 38-40 (1997).

At bottom, Taylor argues that its products have no support plates, that support plates are a key limitation included in the '574 Patent, and that Taylor's products cannot, therefore, infringe the '574 Patent. CWI responds that the Shackle Buoy does contain a support plate, namely, the PVC tube that runs through the center of the Taylor buoys.

Even if the court were to find that the Shackle Buoy, alone or in combination with the Mooring Collar, did include a support plate, Taylor still would not have committed infringement. The '574 Patent claims a buoy with a shackle that is connected or attached to a support plate, which is in turn connected or attached to an anchor chain. A person

using CWI's invention attaches the boat's mooring line to the CWI buoy's support plate via a shackle, and the anchor chain has previously been securely fastened to opposite side of the support plate. See '574 Patent claim 17, col. 7, lines 3, 16-17 (claiming "A mooring device for a buoy comprising . . . a support plate disposed in the pocket, the support plate connected to the shackle and to an anchor chain" (emphasis added)). Taylor's Shackle Buoy and Mooring Collar work differently. A person who uses a Shackle Buoy, with or without a Mooring Collar, connects the boat's mooring line directly to the anchor chain. This is a fundamentally different usage than the one described in the specification and claims of the '574 Patent. See col. 2, lines 53-56 ("For instance, a line from a vessel is attached to the shackle, which is attached to the support plate. An anchor chain is also attached to the support plate.") (references to Fig. 1 omitted); col. 6, lines 21-24 (claim 1 includes "a support plate disposed in the pocket, the fastening device connected to the support plate . . ."); col. 8, lines 45-48 (claim 35 includes "a support plate disposed in the pocket, the fastening device and the line connected to the support plate such that an external force acting on the fastening device or the line is diffused by the support plate"). Though CWI argues to the contrary, the anchor chain and the PVC sleeve inside Taylor's Shackle Buoy are neither "connected" nor "attached" by way of the friction between them. Even when the Mooring Collar is added to the Shackle Buoy, the anchor chain and mooring line are still connected directly to one another – not to any support plate that may be a feature of Taylor's products. See DeRuscio Decl. ¶ 4 ("The function of the T3C Mooring Collar is to protect the buoy and, specifically, the tube running through that buoy from frictional damage from the sliding chain. It does not attach to the mooring or anchor lines or the shackle."). While the

mooring line and anchor chain may come into contact with the Shackle Buoy and/or the Mooring Collar, they are not connected or attached to those products within the meaning of the '574 Patent.

As a result, the Shackle Buoy and the Mooring Collar do not directly infringe the '574 Patent, either literally or by the doctrine of equivalents.

#### **b. Indirect infringement**

The court next considers whether Taylor has indirectly infringed the '574 Patent. Indirect infringement occurs when a party either “actively induces infringement of a patent” or commits contributory infringement by selling or offering to sell “a material part of the invention, knowing the same to be especially made or especially adapted for use in an infringement of such patent, and not a staple article or commodity of commerce suitable for substantial noninfringing use . . . .” 35 U.S.C. § 271(b)-(c).

#### **i. Active inducement**

CWI alleges that Taylor actively induces infringement by selling the Shackle Buoy in conjunction with the Mooring Collar. Taylor responds that it does not sell the Shackle Buoy and Mooring Collar together, does not make or use these products as a package, and does not advertise these products together.

Active “inducement gives rise to liability only if the inducement leads to actual infringement. That principle, that there can be no indirect infringement without direct infringement, is well settled.” Akamai Techs., Inc. v. Limelight Networks, Inc., 692 F.3d 1301, 1308 (Fed. Cir. 2012) (internal citations omitted), cert. dismissed, 133 S. Ct. 1520 (U.S. 2013) and cert. dismissed, 133 S. Ct. 1521 (U.S. 2013); see also Ricoh Co. v. Quanta Computer Inc., 550 F.3d 1325, 1341 (Fed. Cir. 2008) (“[A] finding of inducement

requires a threshold finding of direct infringement – either a finding of specific instances of direct infringement or a finding that the accused products necessarily infringe.”

(citations omitted)). Unlike direct infringement, which is a strict liability tort, an accused inducer must act with “knowledge that the induced acts constitute patent infringement.”

Global-Tech Appliances, Inc. v. SEB S.A., --- U.S. ---, 131 S. Ct. 2060, 2068 (2011).

However, “inducement does not require that the induced party be an agent of the inducer or be acting under the inducer's direction or control to such an extent that the act of the induced party can be attributed to the inducer as a direct infringer. It is enough that the inducer causes, urges, encourages, or aids the infringing conduct and that the induced conduct is carried out.” Akamai Techs., 692 F.3d at 1308 (internal quotations omitted).

The court has already found that Taylor’s Shackle Buoy and Mooring Collar, even when used in combination, do not directly infringe the ’574 Patent. As a result, there can be no induced infringement. Moreover, while CWI provides invoices from a third party marine supply business that indicate that some customers have ordered a Shackle Buoy and a Mooring Collar at the same time, see, e.g., Pl.’s Opp’n Ex. N at 2, 3, this evidence does not establish specific instances of direct infringement. Without more, these invoices do not show that any of these customers ever used the Mooring Collar and Shackle Buoy together, or that Taylor ever marketed them as a package.

## **ii. Contributory infringement**

Finally, CWI argues that Taylor’s Shackle Buoy contributorily infringes the ’574 Patent the moment it is put to use, “i.e., when external forces acting on the fastening device are diffused by the support plate.” Pl.’s Opp’n 33. CWI makes the conclusory assertion that Taylor’s product “has no substantial, non-infringing use.” Id. Taylor, on



the other hand, states that the Mooring Collar is a product that pre-dates the '574 Patent and is wholly produced by a third party.

As with active inducement, a plaintiff seeking to prove contributory infringement must prove an act of direct infringement. Lucent Techs., Inc. v. Gateway, Inc., 580 F.3d 1301, 1320 (Fed. Cir. 2009). Additionally, a plaintiff who wishes to succeed on a claim of contributory infringement must also “show that defendant ‘knew that the combination for which its components were especially made was both patented and infringing’ and that defendant’s components have ‘no substantial non-infringing uses.’” Id. (quoting Cross Med. Prods., Inc. v. Medtronic Sofamor Danek, Inc., 424 F.3d 1293, 1312 (Fed. Cir. 2005)).

Because the Shackle Buoy, used alone or in combination with the Mooring Collar, does not directly infringe the '574 Patent, Taylor cannot have committed contributory infringement. Additionally, the Mooring Collar has a substantial non-infringing use, that is, to reinforce the neck of any Taylor buoy that contains a tube through its center. Indeed, the Mooring Collar was originally designed for use with a different Taylor buoy. DeRuscio Decl. ¶ 5.

#### **B. CWI's Motion for Partial Summary Judgment**

CWI's motion for partial summary judgment seeks a declaration that the Shackle Buoy infringes the '574 Patent, or, in the alternative, that the Shackle Buoy and Mooring Collar infringe the '574 Patent when used in combination. Because the court grants Taylor's motion for summary judgment, it must deny CWI's motion.

### **III. CONCLUSION**

For the foregoing, the court **GRANTS** defendants' motion for Markman claim construction and for summary judgment of non-infringement, ECF No. 34. The court **DENIES** plaintiff's motion for partial summary judgment, ECF No. 57.

**AND IT IS SO ORDERED.**

A handwritten signature in black ink, appearing to read 'D. Norton', written over a horizontal line.

**DAVID C. NORTON**  
**UNITED STATES DISTRICT JUDGE**

**January 9, 2014**  
**Charleston, South Carolina**

(12) **United States Patent**  
**Rogerson**

(10) **Patent No.:** **US 6,955,574 B2**  
(45) **Date of Patent:** **Oct. 18, 2005**

(54) **SHACKLE POCKET BUOY**

(76) Inventor: **L. Keith Rogerson**, #9 Fourth Ave.,  
Isle of Palms, SC (US) 29451

(\*) Notice: Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/767,670**

(22) Filed: **Jan. 29, 2004**

(65) **Prior Publication Data**

US 2005/0170718 A1 Aug. 4, 2005

(51) Int. Cl.<sup>7</sup> ..... **B63B 22/02**

(52) U.S. Cl. .... **441/3**

(58) Field of Search ..... 441/3, 6; 114/230.1,  
114/230.2, 230.26, 230.28, 230.29

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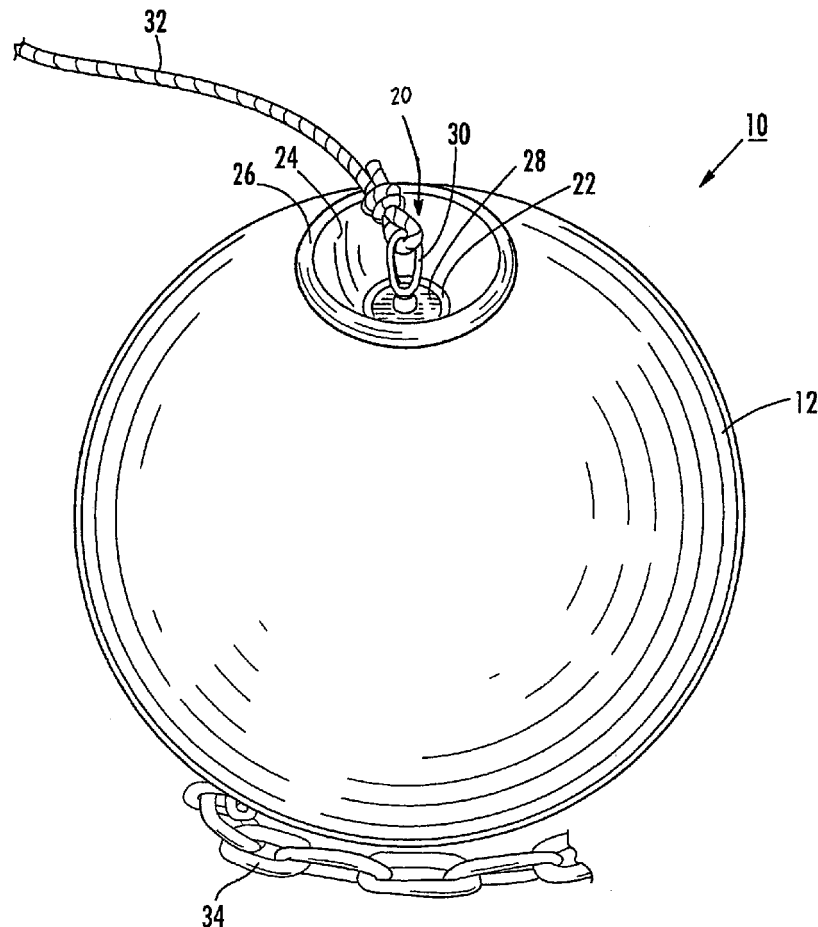
Primary Examiner—Ed Swinehart

(74) Attorney, Agent, or Firm—Dority & Manning, P.A.

(57) **ABSTRACT**

A buoy for tethering a vessel has a pocket that retains a fastening device below an outer surface of the buoy to protect the vessel from contact by the fastening device. A method of manufacturing the buoy utilizes a processing line that molds elements of the buoy including the pocket.

**35 Claims, 4 Drawing Sheets**

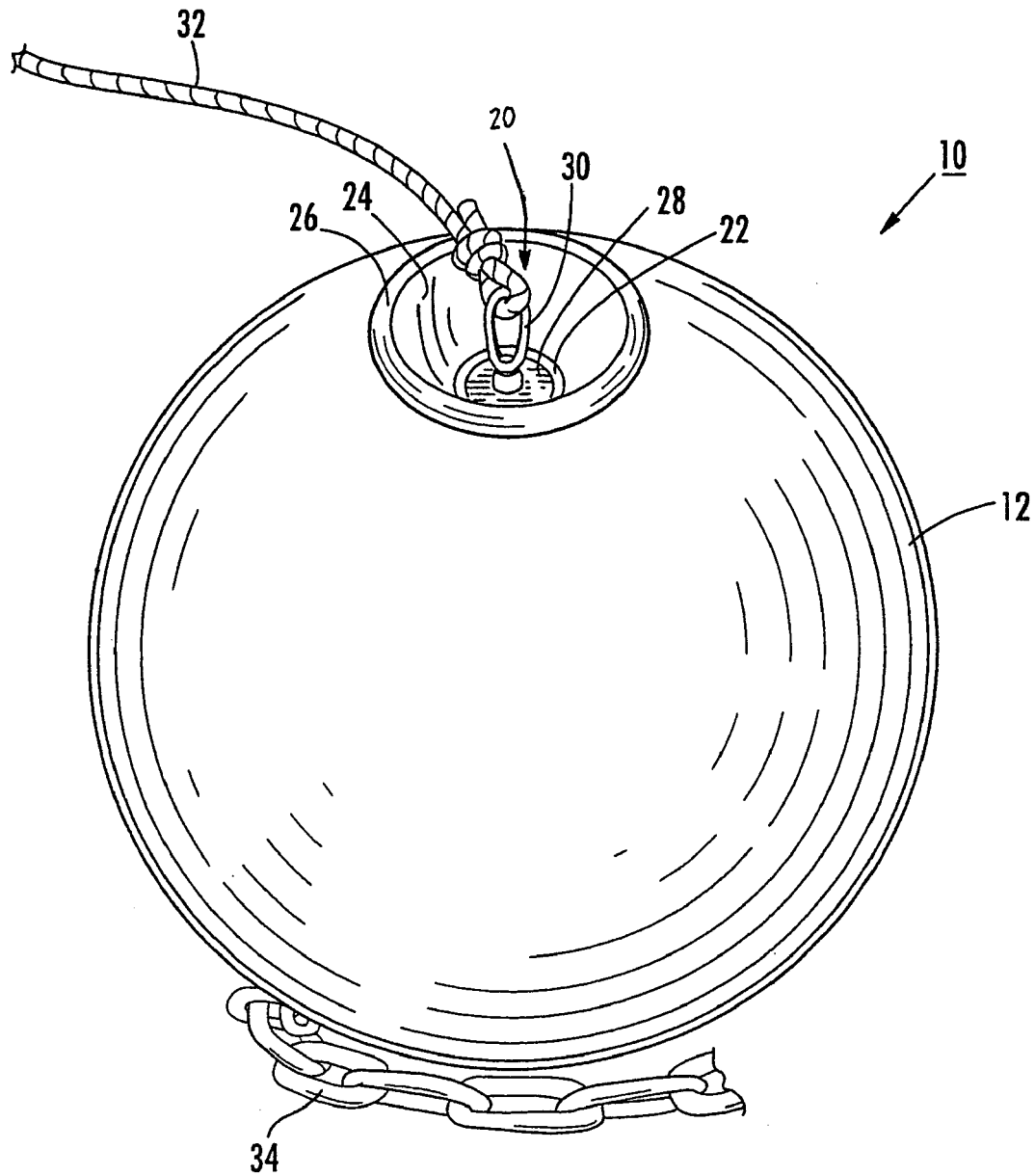


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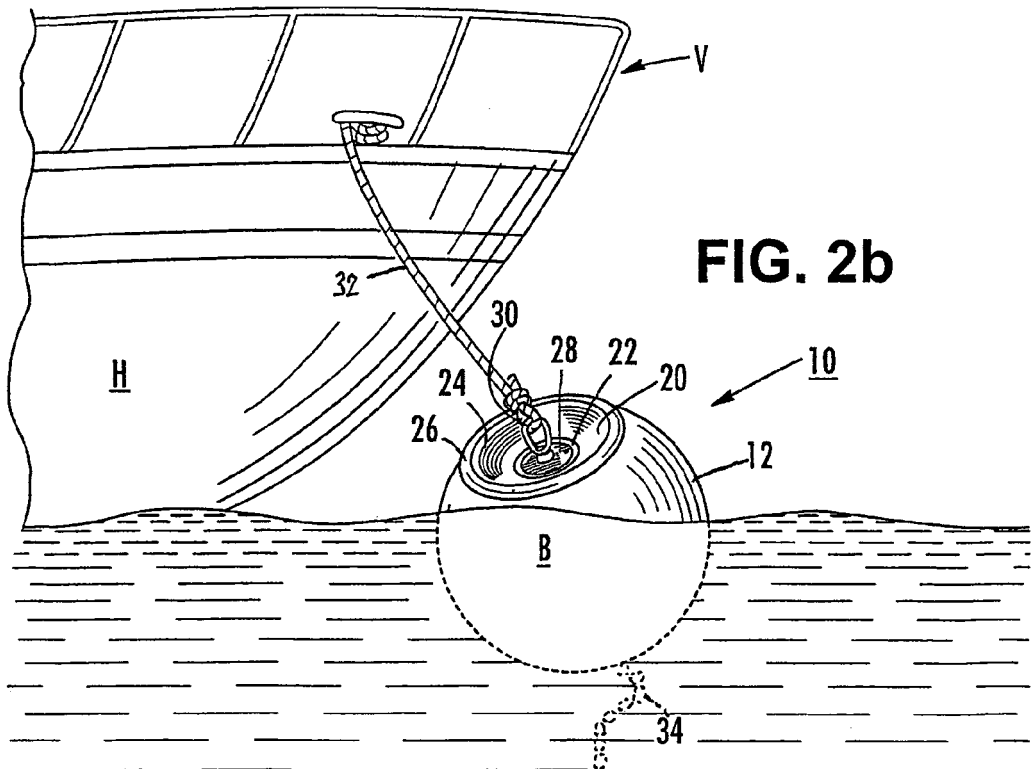
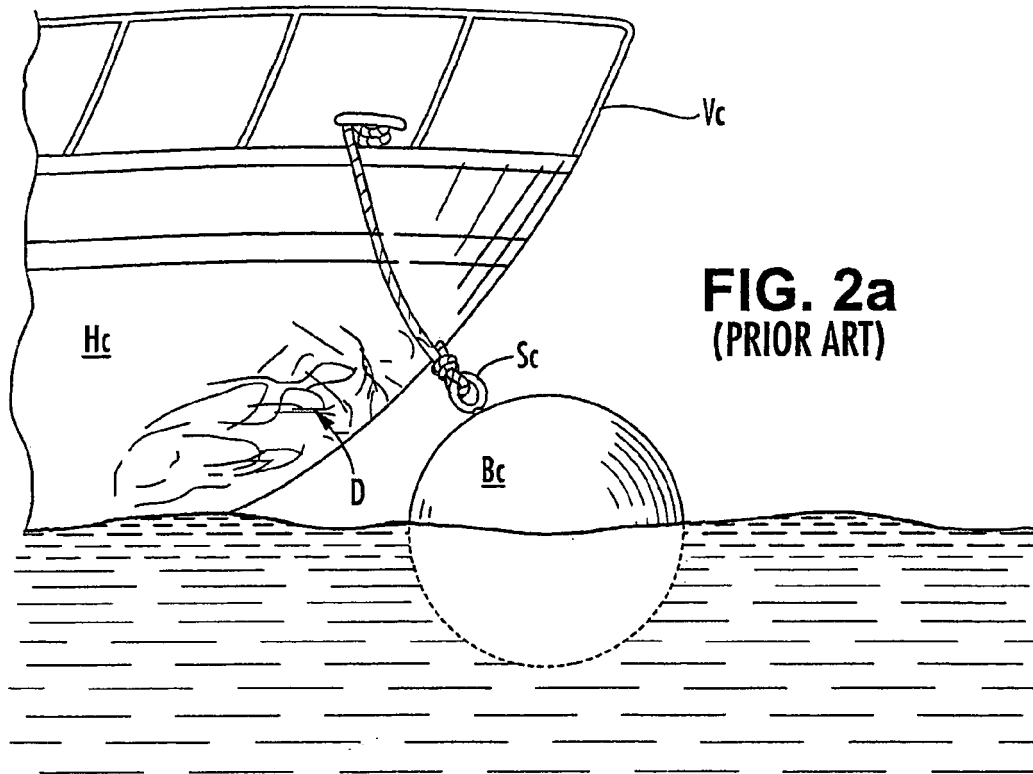
**FIG. 1**

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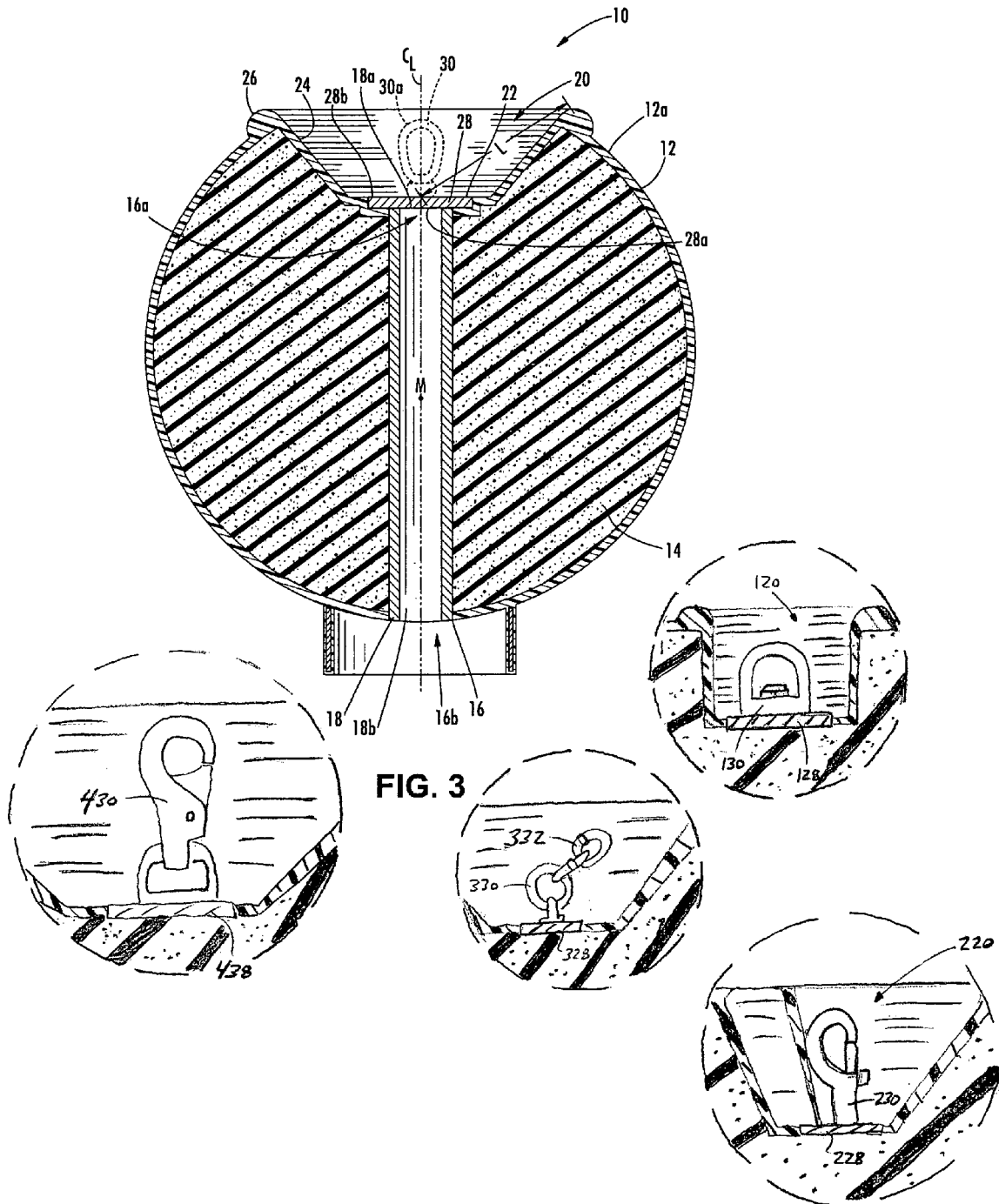


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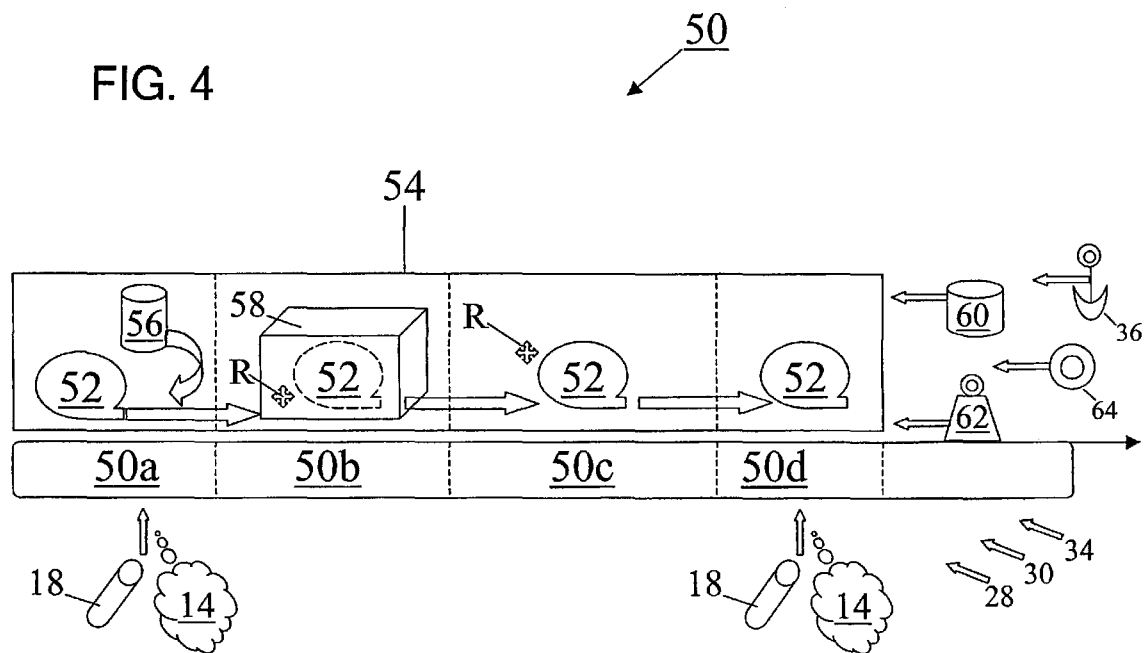


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**SHACKLE POCKET BUOY****FIELD OF THE INVENTION**

This invention relates to buoys. More specifically, the invention is directed to a buoy having a pocket in which a tethering device is retained to prevent its contact and damage to a vessel tethered to the buoy.

**BACKGROUND OF THE INVENTION**

Mooring buoys are well known for mooring a vessel in open water without having to dock the vessel pierside. One drawback of the typical mooring buoy is its exposed shackle, which can contact a vessel hull due to wave action and other forces acting on the vessel and the buoy. Contact between the vessel hull and the conventional buoy mars the vessel hull and in some cases, may cause significant damage and affect the vessel's seaworthiness.

A mooring buoy is needed that safeguards vessel hulls from contact by exposed shackles and the associated damage caused by such contact.

**BRIEF SUMMARY OF THE INVENTION**

The present invention provides a buoy having a shackle pocket in which the shackle is recessed beneath a plane of an outer surface of the buoy to protect a vessel moored to the buoy from exposure to the shackle. The component parts of the buoy are simple and economical to manufacture, assemble, and use. Other advantages of the invention will be apparent from the following description and the attached drawings or can be learned through practice of the invention.

According to one aspect of the invention, a buoy for mooring vessels is provided with a shell having an outer surface with a pocket defined therein. The pocket is formed to maintain a fastening device below a plane of the outer surface in a direction of a midpoint of the buoy such that a vessel moored to the buoy is shielded from contact by the fastening device. A buoyant element is retained within the shell to provide flotation for the buoy.

In another aspect of the invention, a mooring device for a buoy is provided having a shackle for attaching a mooring line from a vessel; a pocket defined in a surface of a buoy to retain the shackle below the surface in a direction of a midpoint of the buoy such that a hull of the vessel moored to the buoy is shielded from contact by the shackle; and a protrusion disposed proximate the pocket depending from the surface of the buoy in a direction away from the midpoint, the protrusion configured to increase a size of the pocket such that the shackle is further removed from the surface of the buoy, the protrusion further configured to make contact with the vessel in lieu of the shackle.

Other aspects and advantages of the invention will be apparent from the following description and the attached drawings, or can be learned through practice of the invention.

**BRIEF DESCRIPTION OF THE DRAWINGS**

The above and other aspects and advantages of the present invention are apparent from the detailed description below and in combination with the drawings in which:

FIG. 1 is a perspective view of one embodiment of a mooring buoy in accordance with the present invention;

FIG. 2a shows a conventional buoy and particularly, damage to a vessel hull caused by an exposed shackle;

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FIG. 2b shows a buoy similar to FIG. 1;

FIG. 3 is a cross sectional view of a buoy similar to FIGS. 1 and 2b and including a ballast device; and

FIG. 4 is a schematic view of an embodiment of a processing line for performing a method of manufacturing a buoy as in FIG. 1.

**DETAILED DESCRIPTION OF THE DRAWINGS**

Detailed reference will now be made to the drawings in which examples embodying the present invention are shown. The detailed description uses numerical and letter designations to refer to features in the drawings. Like or similar designations in the drawings and description have been used to refer to like or similar parts of the invention.

The drawings and detailed description provide a full and detailed written description of the invention, and of the manner and process of making and using it, so as to enable one skilled in the pertinent art to make and use it, as well as the best mode of carrying out the invention. However, the examples set forth in the drawings and detailed description are provided by way of explanation of the invention and are not meant as limitations of the invention. The present invention thus includes any modifications and variations of the following examples as come within the scope of the appended claims and their equivalents.

As broadly embodied in FIGS. 1, 2b and 3, a buoy, generally designated by the number 10, is shown with a shackle pocket 20 in which a mooring or fastening device such as a shackle 30 is embedded to protect a vessel hull from contact and damage by the shackle 30. As described in detail below, the components of the buoy 10, their placement and dimensions are modifiable to accommodate various vessel and anchor line sizes and manufacturing requirements and are not limited to only those examples shown in the Figures. For instance, although the buoy 10 is shown generally ball-shaped, any shape such as can-shaped, box-shaped, pyramid-shaped, nun-buoy (cone) shaped, drum-shaped, or combinations of these and other shapes are within the scope of the present invention. Additionally, the buoy 10 can be sized to meet any manufacturing or customer requirement such as by adjusting its diameter (from about 12 inches to about 32 inches) and its weight (from about 25 pounds to about 530 pounds).

With particular reference to FIG. 1, the buoy 10 generally includes a shell 12 in which the shackle pocket 20 is formed and in which the shackle 30 is attached. The shackle pocket 20 defines a support plate pocket 22 and a bowl-shaped wall 24. A protrusion or annular lip 26 is formed about the shackle pocket 20 in this example. Also, a complementarily shaped support plate 28 is seated in the support plate pocket 22 to protect other components of the buoy 10 from external forces. For instance, a line 32 from a vessel V (see, e.g., FIG. 2b) is attached to the shackle 30, which is attached to the support plate 28. An anchor chain 34 is also attached to the support plate 28. Described by example operation below, as the line 32 and the anchor chain 34 move due to external forces, they act on the support plate 28 rather than other components of the buoy 10.

The shell 12 in FIG. 1 is made of made of any impact- and weather-resistant material such as polyethylene, more particularly, high-density polyethylene (HDPE), or polypropylene, polyvinyl chloride, rubber, fiberglass, nylon, POM (polyoxymethylene; i.e., acetal plastic), PEEK (polyetheretherketone), or any natural (e.g., wood) or synthetic materials or their combinations suitable for flotation on a body of water. In one aspect of the invention, the shell 12 has a wall



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thickness of about  $\frac{3}{16}$  of an inch, although other wall thicknesses can be made to meet specific requirements. A method of producing the buoy 10 including the shell 12 is described in detail below.

The shackle 30 in FIG. 1 is swivelably attached to the support plate 28 to permit the vessel V (FIG. 2b) freedom to swing about the buoy 10 as wind and current change. The shackle 30 can be any fixed or swivelable fastening device such as a link of chain, a D-shaped ring, an O-shaped ring, a clasp, a hook and eye apparatus, or combinations of these and other devices suitable for attaching the line 32.

Turning to FIG. 2a, a conventional mooring buoy  $B_c$  is shown with a typical ring-type shackle  $S_c$  projecting from the mooring buoy  $B_c$ . Due to wave action and other external forces on one or both of a tethered vessel  $V_c$  and the mooring buoy  $B_c$ , the exposed shackle  $S_c$  repeatedly strikes a hull  $H_c$  of the vessel  $V_c$  causing scratches and dents at area D. With repeated exposure and sufficient force, the shackle  $S_c$  can compromise the vessel hull  $H_c$  and adversely affect seaworthiness of the vessel  $V_c$ .

FIG. 2b shows the unique shackle pocket 20 in operation. In this example, the vessel V is moored to the buoy 10 by attaching the line 32, which can be a chain, a rope, a cable, a line or similar rigging. The buoy 10 itself is anchored in an area of water by the anchor chain 34, which also can be a rope, cable, line or the like. As shown, the shackle 30 is safely recessed within the shackle pocket 20 in contrast to the conventional mooring buoy  $B_c$  and its exposed shackle  $S_c$ . Thus, the shackle 30 does not contact a hull H of the vessel V due to wave or wind action or movement of the vessel V or varying aspect angles of the buoy 10 and the vessel V relative to each other.

FIG. 3 shows a detailed cross-section of the buoy 10. The shell 12 encapsulates a buoyant element 14, which is an expanded polystyrene fill material in this example. As known, polystyrene is a polymer of styrene, and expanded polystyrene appears as a rigid white foam often used as packing or insulation material. A suitable expanded polystyrene fill material is available from Huntsman Chemical Corporation headquartered in Houston, Tex. Other materials or elements that are lighter than water are also suitable to provide flotation to the buoy 10. For instance, polyurethane foam, cork, a gas such as helium, or combinations of these elements can be substituted for polystyrene.

FIG. 3 further shows a ballast 62, which is attached to or added in the buoy 10 to positively affect a characteristic of the buoy 10. For instance, by adding weight (i.e., counterweights) in the form of the ballast 62 in specific regions of the buoy 10, above-water exposure of the buoy 10 can be controlled. Also, upright stability of the buoy 10 can be ensured to maintain an aspect of the shackle pocket 20 relative to a horizontal plane; i.e., to maintain a centerline  $C_L$  of the buoy 10, e.g.,  $\pm 30$  degrees of the horizontal plane for 360 degrees of rotation. Alternatively stated, the ballast 62 can be utilized to control bobbing, rolling, and drifting behaviors of the buoy 10.

Also shown in FIG. 3, a passage or core 16 is coaxially aligned with the centerline CL of the buoy 10. The core 16 has a first opening 16a and a second opening 16b and passes through a midpoint M of the buoy 10.

A pipe or tube 18 inserted in the core 16 and is therefore also coaxially aligned with the centerline  $C_L$  and passes through the midpoint M. The tube 18 defines a first end 18a and a second end 18b, which respectively lie in co-circumferential relationship with the first and second openings 16a, 16b of the core 16.

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In one aspect of the invention, an inner diameter of the tube 18 is about  $1\frac{1}{2}$ –3 inches but can be sized to accommodate various sizes of anchor chain 34. Similarly, a length of the tube 18 can be varied in accordance with a size of the buoy 10.

The tube 18 is made from any material such as a hardened plastic (having a thickness of at least about  $\frac{1}{4}$  inch polyethylene), a metal, or another suitably hard material made to resist wear and tear by the anchor chain 34 as the anchor chain 34 moves within the tube 18 due to wave or wind action, a motion of the vessel V, or combinations of these external forces. Further description of the tube 18 and its attachment and interaction with the support plate 28 are discussed below.

FIG. 3 also shows the shackle pocket 20 recessed in a surface 12a of the shell 12 and centered about the centerline  $C_L$ . As briefly introduced above, the support plate 28 is seated in the support plate pocket 22 of the shackle pocket 20. The support plate 28 is secured to the support plate pocket 22 such as by press-fitting or molding, or by adhesives, screws, rivets, bolts, and similar mechanical attachments.

The first end 18a of the tube 18 is attached to the support plate 28 on one side 28a such as by welding or appropriate mechanical attachment. The shackle 30 is attached to an opposing side 28b of the support plate 28 by adhesives, screws, rivets, bolts, and similar mechanical attachments. In this manner, as the anchor chain 34 (see, e.g., FIG. 2b) moves within the tube 18 due to the external forces noted above, the support plate 28 receives and diffuses the forces, which protects other components of the buoy 10 such as the buoyant element 14.

Also shown in FIG. 3, the shackle pocket 20 defines the bowl-shaped wall 24 briefly introduced above. The wall 24 is annular and slopes downwardly in a direction of the midpoint M in this example. A slope of the wall 24 from about 25 degrees to about 75 degrees relative to the centerline CL effectively recesses the shackle 30 for protection of the vessel hull H. Other angles or slopes of the bowl-shaped wall 24 can also be provided. It will be further appreciated that the exemplary pocket 20 can be other than bowl-shaped, such as a box-shape, a pyramid-shape, a funnel-shape or combinations of these and other shapes.

FIG. 3 further shows an annular protrusion or lip 26 formed on the outer surface 12a of the shell 12 near the pocket 20. As shown, the lip 26 depends from the surface 12a in a direction away from the midpoint M approximately  $\frac{1}{2}$  inch to about 6 inches from the surface 12a. Various sizes and shapes of the lip 26 can be provided to accommodate manufacturing or customer requirements. For example, the annular lip 26 can be a series of raised bumps or the like. Alternatively, the annular lip 26 can be a collar device made for permanent affixation to the buoy 10 after the buoy 10 is formed.

Further, the collar can be detachable for subsequent attachment to or detachment from the buoy 10.

As shown, the annular lip 26 virtually increases a depth or length L of the pocket 20 relative to the surface 12a to further shield the shackle 30 within the pocket 20.

Specifically, the lip 26 serves to limit an extent of a distal end 30a of the shackle 30 since the length L of the pocket 20 from proximate the plate pocket 22 at the centerline  $C_L$  to an outermost edge of the lip 26 is greater than the extent of the distal end 30a. Thus, the distal end 30a terminates short of the outermost edge of the lip 26; i.e., within the pocket 20. However, even without the lip 26, the pocket 20 is sufficiently deep to terminate the distal end 30a of the

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shackle **30** below the surface **12a** of the shell **12**. Alternatively stated, if the shell **12** covered the pocket **20**, the distal end **30a** would also be covered. Accordingly, with further reference to FIG. **2b**, the lip **26** will make contact with the vessel **V** instead of the shackle **30** in the event the buoy **10** pitches toward the vessel **V** in a manner that directs the pocket **20** toward the vessel **V**.

Turning to FIG. **4**, a method of manufacturing the buoy **10** as in FIG. **3** is provided in another aspect of the invention. A processing line **50** is used to practice the method. The method includes the steps of forming the shell **12** to include the shackle pocket **20** and optionally, the lip **26**; bonding the tube **18** into the shell **12**; injecting or inserting the buoyant element **14** into the shell **12** and about the tube **18**; and attaching the support plate **28**, the shackle **30**, the anchor chain **34**, and/or a dead weight or anchor **36**.

The step of forming the shell **12** is performed by rotational molding (rotomolding), injection molding, blow molding or the like. By way of example, the rotomolding process starts with a quality cast or fabricated mold **52** as schematically shown in FIG. **4**. The mold **52** is placed in a rotomolding machine **54** that has a loading area **50a**, a heating area **50b**, a cooling area **50c**, and a finishing or staging area **50d**. Pre-measured plastic resin **56** such as HDPE is loaded into the mold **52** in the loading area **50a**. The mold **52** is moved into an oven **58** in the heating area **50b** where it is slowly rotated on both vertical and horizontal axes as indicated by the rotating axes symbol **R**. The melting resin **56** sticks to the hot mold **52** and evenly coats every surface of the mold **52** unless otherwise required, e.g., to form various wall thicknesses. Lastly, the rotomolded shell **12** is moved to the cooling area **50c** where it is cooled and released from the mold **52** and sent to the staging or finishing area **50d**.

Rotational speed, heating and cooling times are all controlled throughout the foregoing process and each can be adjusted to modify characteristics of the shell **12**, such as its wall thickness. As noted above, the shell **12** can have differing wall thicknesses in particular sections, for instance, about  $\frac{3}{16}$  of an inch of HDPE at upper and lower sections of the buoy **10** and about  $\frac{1}{2}$  of an inch HDPE in a middle section of the buoy **10**. Further, although rotomolding the shell **12** has been described by way of example, the shell **12** can be otherwise formed using other steps and materials; for example, by blow molding polypropylene.

The step of bonding the tube **18** into the shell **12** can be performed when the resin **56** is loaded into the mold **52**, or after the shell **12** is released from the mold **52**. Similarly, the buoyant element **14**, described in detail above, can be preformed and placed about the tube **18** for subsequent encapsulation by the shell **12**, or injected as a foam for hardening about the tube **18**, or as a gas following formation of the shell **12**.

Another step in the exemplary method is to affix the lip **26** in the form of a collar device if the lip **26** was not unitarily formed with the shell **12**. Also, the shell **12** can be colored during its formation or subsequently painted, and/or customized graphics or color schemes **60** can be applied. The ballast **62** can also be added prior to insertion of the buoyant element **14** or thereafter. Additionally, an underwater float **64** can be attached to the anchor chain **34**, for instance, to locate the chain **34**.

While preferred embodiments of the invention have been shown and described, those skilled in the art will recognize that other changes and modifications may be made to the foregoing embodiments without departing from the scope and spirit of the invention. For example, specific buoy sizes and dimensions and specific shapes of various elements of

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the illustrated embodiments may be altered to suit particular applications. It is intended to claim all such changes and modifications as fall within the scope of the appended claims and their equivalents.

Moreover, references herein to "top," "lower," "bottom," "upward," "downward," "upright", and "side" structures, elements and geometries and the like are intended solely for purposes of providing an enabling disclosure and in no way suggest limitations regarding the operative orientation of the exemplary embodiments or any components thereof.

What is claimed is:

1. A buoy for mooring vessels comprising:

a shell having an outer surface with a pocket defined therein, the pocket configured to maintain a fastening device below a plane of the outer surface in a direction of a midpoint of the buoy such that a vessel moored to the buoy is shielded from contact by the fastening device;

a buoyant element retained within the shell to provide flotation; and

a support plate disposed in the pocket, the fastening device connected to the support plate such that an external force acting on the fastening device is diffused by the support plate.

2. The buoy as in claim 1, further comprising a tube depending through the midpoint of the buoy, the tube configured for routing a line to anchor the buoy in a body of water, the tube made from a material configured to resist wear and tear from a movement of the line resulting from a motion of the body of water, a motion of the vessel or combinations thereof.

3. The buoy as in claim 1, wherein the buoyant element is one of a polystyrene material, a polyurethane foam, a cork, or a gas.

4. The buoy as in claim 1, wherein the shell is made of a material selected from the group consisting of a polyethylene, a polyvinyl chloride, a rubber, a fiberglass, a nylon, an acetal plastic, a polypropylene, and a polyetheretherketone.

5. The buoy as in claim 4, wherein the shell is made from polyethylene and the polyethylene is a high-density polyethylene.

6. The buoy as in claim 1, wherein the shell is ball-shaped, can-shaped, cone-shaped, or drum-shaped.

7. The buoy as in claim 1, wherein the pocket defines a wall depending downwardly in a direction of the midpoint.

8. The buoy as in claim 7, wherein the wall is bowl-shaped and depends from about 25 degrees to about 75 degrees from a centerline of the buoy.

9. The buoy as in claim 1, wherein the pocket is funnel-shaped.

10. The buoy as in claim 1, wherein the fastening device is a shackle.

11. The buoy as in claim 1, wherein the fastening device is configured to swivel about a centerline of the buoy.

12. The buoy as in claim 1, further comprising an annular lip formed on the outer surface of the shell proximate the pocket, the annular lip configured to increase a depth of the pocket to further shield the fastening device within the pocket.

13. The buoy as in claim 1, wherein the pocket defines a support plate pocket therein, the support plate pocket shaped complementary to the support plate to house the support plate.

14. The buoy as in claim 1, further comprising a ballast configured to affect a buoy characteristic.

15. The buoy as in claim 14, wherein the characteristic is upright stability, or counterweight.

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16. The buoy as in claim 1, further comprising a line to anchor the buoy in the body of water.

17. A mooring device for a buoy comprising:

a shackle for attaching a mooring line from a vessel;

a pocket defined in a surface of a buoy to retain the shackle below the surface in a direction of a midpoint of the buoy such that a hull of the vessel moored to the buoy is shielded from contact by the shackle;

a protrusion disposed proximate the pocket depending from the surface of the buoy in a direction away from the midpoint, the protrusion configured to increase a size of the pocket such that the shackle is further removed from the surface of the buoy, the protrusion further configured to make contact with the vessel in lieu of the shackle; and

a support plate disposed in the pocket, the support plate connected to the shackle and to an anchor chain for anchoring the buoy in a body of water.

18. The mooring device as in claim 17, wherein the shackle is configured to swivel about a centerline of the buoy.

19. The mooring device as in claim 17, wherein a distal end of the shackle terminates beneath an outermost edge of the protrusion.

20. The mooring device as in claim 17, wherein the pocket is bowl-shaped or funnel-shaped.

21. The mooring device as in claim 17, wherein the surface of the buoy is made of a material selected from the group consisting of a polypropylene, a polyethylene, a polyvinyl chloride, a rubber, a fiberglass, a wood and combinations thereof.

22. The mooring device as in claim 17, wherein the protrusion is a collar affixed to the surface.

23. The mooring device as in claim 17, further comprising a buoyant element disposed beneath the surface of the buoy, the buoyant element selected from the group consisting of a polystyrene material, a polyurethane foam, a cork, a gas, and combinations thereof.

24. The mooring device as in claim 17, wherein the pocket defines a support plate pocket therein, the support plate pocket shaped complementary to the support plate to house the support plate.

25. A method of manufacturing a buoy, comprising the steps of:

forming a shell defining a shackle pocket therein;

bonding a tube within the shell;

inserting a buoyant element into the shell and about the tube;

attaching a shackle within the shackle pocket such that the shackle is disposed beneath a surface of the shell; and

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attaching a support plate in the shackle pocket, the shackle attached to the support plate.

26. The method as in claim 25, wherein the shell is formed by rotational molding, blow molding, or injection molding.

27. The method as in claim 25, further comprising the steps of forming the buoyant element, placing the formed buoyant element about the tube, and forming the shell about the buoyant element and tube for encapsulation by the shell.

28. The method as in claim 25, further comprising the step of injecting the buoyant element into the formed shell.

29. The method as in claim 28, further comprising the step of hardening the buoyant element about the tube in the formed shell.

30. The method as in claim 25, further comprising the step of attaching an anchor chain, a dead weight, an anchor or combinations thereof to the buoy.

31. The method as in claim 25, further comprising the step of adding ballast to the buoy.

32. The method as in claim 25, further comprising the step of forming a lip on the shell proximate the shackle pocket, the lip configured to shield a vessel from the shackle.

33. The method as in claim 25, further comprising the step of attaching a lip on the shell proximate the shackle pocket after formation of the shell, the lip configured to shield a vessel from the shackle.

34. A processing line for manufacturing a mooring buoy according to claim 1, the processing line comprising:  
means for forming a buoy shell defining a shackle pocket therein;

means for bonding a tube within the buoy shell;

means for inserting a buoyant element into the shell and about the tube; and

means for attaching a shackle within the shackle pocket such that the shackle is disposed beneath a surface of the buoy shell.

35. A buoy for mooring vessels comprising:

a shell having an outer surface with a pocket defined therein, the pocket configured to maintain a fastening device below a plane of the outer surface in a direction of a midpoint of the buoy such that a vessel moored to the buoy is shielded from contact by the fastening device;

a buoyant element retained within the shell to provide flotation; and

a support plate disposed in the pocket, the fastening device and the line connected to the support plate such that an external force acting on the fastening device or the line is diffused by the support plate.

\* \* \* \* \*

**CERTIFICATE OF SERVICE**

I hereby certify that on this 19th day of May, the foregoing OPENING BRIEF OF APPELLANT was filed using the Court's CM/ECF filing system. Counsel registered with the CM/ECF system were served by operation of the Court's CM/ECF system per Fed. R. App. P. 25 and Fed. Cir. R. 25(c).

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**CERTIFICATE OF COMPLIANCE**

I certify that the foregoing OPENING BRIEF OF APPELLANT contains 6,805 words as measured by the word processing software used to prepare this brief.

Dated: May 19, 2014

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